COMPUTERWORLD

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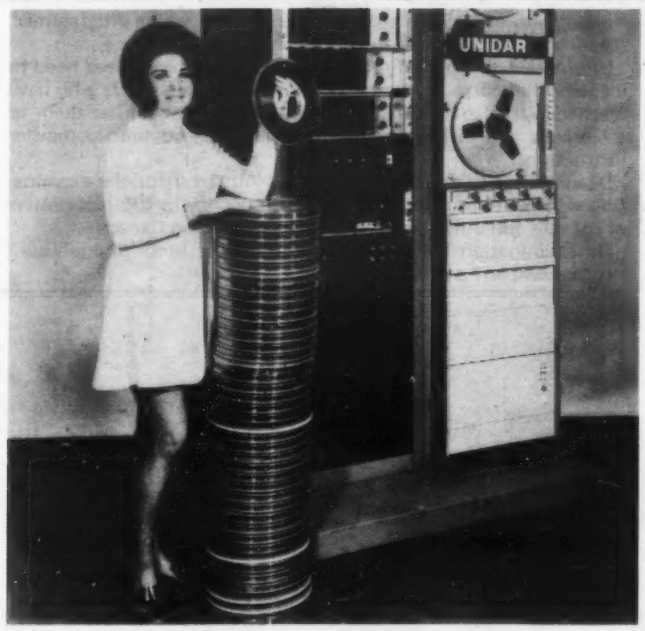

33,000 Bit/Track In.

The computer data in this stack of 40 reels of magnetic tape can be recorded on one reel by a new U.S. Navy-commissioned data recording system. Story on Page 4.

350 Firms to Exhibit

SJCC Expects 40,000

By Drake Lundell
CW New York Bureau

ATLANTIC CITY, N.J. – It may be early for bathing beauties but this resort will be "swinging" when the Spring Joint Computer Conference opens May 5-7 with an expected 40,000 attendees.

Based on the theme of "The Computer: Gathering Force of the Seventies," the huge conference will feature more than 200,000 sq ft of exhibits and 75 formal technical papers arranged in 32 education sessions.

CW's coverage of the SJCC exhibits starts in this issue on Page 20B and will be continued in next week's issue.

Afips, organizer of the joint computer conferences, announced that 350 exhibitors will occupy 960 exhibit booths in Atlantic City's cavernous convention hall, making the SJCC in 1970 almost twice the size of the 1969 Boston SJCC.

This year's conference promises to be one of the smoothest "joints" in years, according to Afips.

The major problem at the joint in Atlantic City seems to be the lack of transportation into the town. To overcome the lack of transportation facilities, Afips will run a bus service from the Philadelphia airport to Atlantic

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L-T Stockholder Files IBM Antitrust Suit

By Peter F. Carr and Edward J. Bride
CW Staff Writers

NEW YORK – Howard S. Levin has joined three major IBM customers in suits involving unbundling with a $750 million antitrust suit of his own.

The action was filed last week in the federal court's Southern District of New York, and closely parallels one filed by Greyhound Computer Corp. [CW, Nov. 12, 1969] and the four-pronged suit in litigation in Minneapolis.

The latter is comprised of four separate suits, one by Data Processing Financial and General (DPF&G), a customer and leasing company like Levin-Townsend and Greyhound, and the other three by competitors of IBM.

The competitors are Control Data Corp., and Applied Data Research, which last summer acquired the other plaintiff, Programmatics, Inc.

Levin filed his suit as the "largest stockholder" of the company which ousted him as president in January.

Among the charges, Levin contends that IBM "breached its obligations" by removing "free" support when it unbundled software and services from hardware prices last June. Like Greyhound, Levin charged that these services had been paid for in the initial purchase of the equipment.

Similar to Other Suits

He also charges, like Greyhound, that concurrent price reductions would make competition in the leasing market impossible, and that the high price of some of the 360 series of equipment, "between 52 and 57 times the IBM rental," discriminates against the purchaser of such equipment and favors the leasing customer.

Levin, like DPF&G, charges that this pricing policy violates a 1956 consent decree between IBM and the Justice Dept., but this charge

(Continued on Page 4)

Audit Trails Lost in Computerization

By Edward J. Bride
CW Staff Writer

DAYTONA BEACH, Fla. – "We don't know where we've been, and we don't know where we are. But we think we're headed in the right direction."

That is the sum and substance of an audit disclaimer written on last year's financial statement for this city of 50,000.

It was caused by the aesthetic separation of computer programs and audit trails, which in turn was caused by the city's rush to computerization, and city officials' and auditors' apparent failure to coordinate the conversion.

The disclaimer only means that the auditors could not trace all the money and verify all the figures. It does not mean that the results are doubted.

Indeed, auditor Donald Zima said the picture is actually better than the one given to the auditors last October, at the end of the city's fiscal year. His firm, Robertson, May, Zima, & Co., just didn't have time to recheck the results.

And, as Zima said: "A few-thousand-dollar difference when you're talking about an $8 or $10-million budget, it doesn't make that much difference. It can't be distorted that much."

Payables Are Not Payable

City Clerk David Edwards explained that some accounts payable were paid, then reprocessed and the money expended again. The bills were not, he said, paid twice.

But the financial statement looked that way. So, Daytona Beach has "a few thousand dollars" more than the auditors originally thought last fall.

Edwards added that over one-fifth of all municipal audits in the country have disclaimers, although this one "was quite a blow to me."

Mrs. Ruby Meyer, the city's chief accountant, said that there was not sufficient time to coordinate the conversion. As a result, she said, the auditors didn't know how to trace back all the

(Continued on Page 4)

10 Students Convicted in 1969 Computer Center Burning

By Joseph Hanlon
CW Staff Writer

MONTREAL – Ten students have been convicted of "conspiracy to obstruct the use of a computer center" in the first trials growing out of the burning and destruction of a computer center at Sir George Williams University Feb. 11, 1969.

In all, 12 adults have been tried so far.

The estimated $1.6 million loss is the largest ever in an attack on a computer center.

The 10 students were acquitted of conspiracy charges relating to the destruction of the computer; if convicted, they could have received up to life in prison.

Two others have been acquitted of all conspiracy charges, and 75 others are still to be tried on conspiracy. All 87 may also be tried later on the substantive charges of arson, damage, and obstructing the computer.

The computer center was actually unrelated to the student protest. The students had occupied the center for two weeks in a dispute growing out of a charge that a biology professor never gave black students more than a "C." About half of the occupying students were black.

(Continued on Page 6)

All computers are vulnerable to outside attack, not just those at universities. Because DP managers are expressing increasing concern about security, CW has analyzed this incident in detail.

Arrested students being held by police while the computer center was still burning.

On the Inside

Era of Social Concern Seen for ACM

OSSINING, N.Y. – Candidates for national ACM offices are more socially concerned than they have been in the past, according to Daniel D. McCracken, Paul Armer, and William S. Dorn.

Dorn is editor-in-chief of ACM's *Computing Surveys*, Armer was an ACM council member-at-large from 1964 through 1968, and McCracken is noted for his book, *Fortran IV Primer*.

The three men circulated a letter, expressing their views on social responsibility, to all 32 candidates for the ACM (Association for Computing Machinery) national office. The candidates were asked to comment on the letter.

Twenty-one responded, and "a majority did express a sincere sympathy with the idea that computer professionals should adopt a habit of seeing technical activities in social context," the three said.

The group found the responses "highly encouraging" and declared: "We look forward to a new era of social consciousness in the ACM."

Based on the general agreement of many of the candidates, McCracken, Armer, and Dorn have decided against endorsing specific candidates.

But the three also noted: "We would not want to misrepresent the situation: there was disagreement with some of our points by some of our candidates. Some, for instance, said that social concerns should be expressed individually and through organizations other than the ACM. A number were concerned that if our ideas were carried to the extreme it would amount to transforming the ACM into a lobbying organization; we fully agree that this must not happen."

In their letter, the three declared: "It is our conviction that one of the major problems facing our society, one approaching crisis proportions, is the tendency for technical people to ignore or deny the social implications of their work.

Applications and Guides Ready For Business Programmer Exam

PARK RIDGE, Ill. – Applications and study guides for the registered business programmer examination developed by the certification council of the Data Processing Management Association are now available from the association.

The 12-page announcement and study guide, in addition to the application, contains information on the exam's objectives, history, administration and scope, and locations of test centers. The exam includes 150 questions and requires 2-1/2 hours to complete.

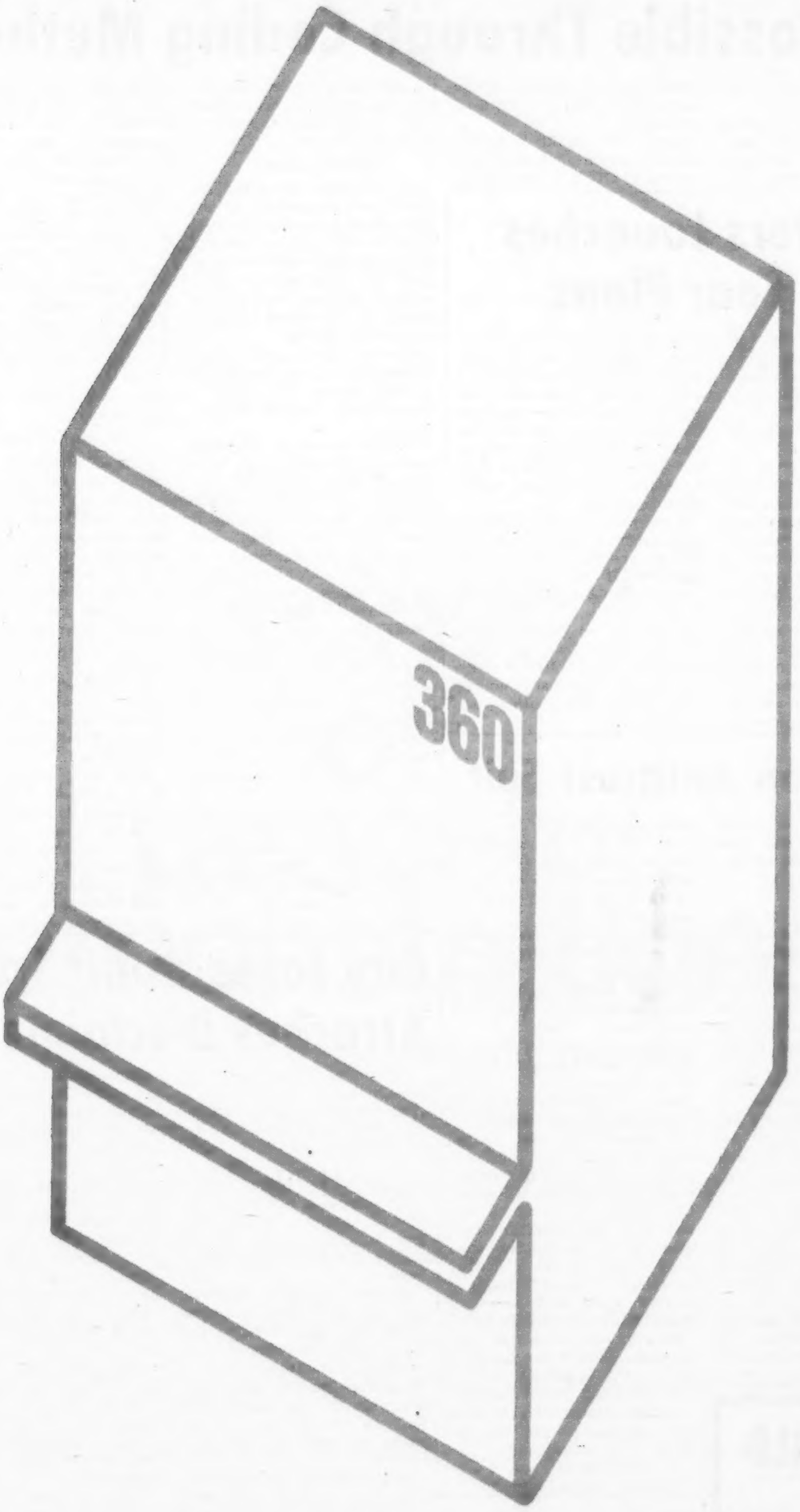
Currently, there are no formal qualification requirements for the exam. It is expected than an applicant will have sufficient training and experience to reach the level of senior programmer. Applicants do not have to be DPMA members.

DPMA said this program has grown out of a recognized need to identify that corps of "practicing business programmers who have reached a level of technical knowledge which qualifies them to effectively and efficiently translate human needs into computer instructions."

Deadline for filing of applications is August 1 for the examination which will be given Saturday, October 10, in 105 test centers at colleges and universities across the U.S. and in Canada.

An examination fee of $40 payable in U.S. funds or equivalent must accompany each application.

POSTMASTER: CHANGE OF ADDRESS FORM 3579 to be sent to Computerworld Circulation Dept., 797 Washington, Newton, Mass. 02160.



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you don't
look sluggish**

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33,000 Bit/In. Possible Through Coding Method

By Frank Piasta
CW Staffwriter

ROCHESTER, N.Y. – A proprietary coding technique developed by General Dynamics is said to make possible packing densities as high as 33,000 bit/in. on magnetic tape.

Based on a technique developed by General Dynamics' antisubmarine warfare products group for the U.S. Navy, the Unidar system initially will be used with an IBM 360 for data acquisition.

Initial tests in this scientific instrumentation application, according to GD, have demonstrated that the amount of magnetic tape required can be reduced 97%, as compared to conventional tape systems.

Packing Density

The techniques developed for Unidar have succeeded in achieving a packing density of 693K bit/sq. in. This places it between that of the latest tape devices at 288K bit/sq in. and the more exotic techniques, such as holography at 100 million bit/sq in. now being explored.

However, if the price of the Unidar devices is not prohibitively high, interest may return to tape-oriented product development.

A prior attempt at using high packing densities and nonstandard tapes in the IBM Hypertape achieved only modest success. Customers seemed to resist both the one-in. noncompatible storage medium as well as the higher cost ($1,310/mo compared to $1,020/mo for the IBM 2420/7).

This would seem to indicate that the course of future research with Unidar might well be concentrated on the development of a competitively priced 1/2-in. tape compatible drive.

The Unidar system of recording can be applied to a variety of data formats and vehicles, including 9-track 1/2-in. tape, according to a company spokesman. The highest packing density commonly used today is 1,600 bit/in. This combined with a tape speed of 200 in./sec, gives a potential data rate of 320K bit/sec.

If a 200 in./sec 9-track tape drive were to be adapted to the Unidar system, the corresponding data rate would be 6.6 million byte/sec.

The data acquisition system for which Unidar was developed over a period of three years will store data at approximately 84 million bit/sec using 21-track one-in. tape.

The reduction of tape required to store a specified amount of data makes feasible applications which up to now were impossible due to prohibitive requirements for either recording equipment or the sheer bulk of the data required.

Information Retrieved

Such applications as information retrieval systems, library reference, and inventory control were mentioned by General Dynamics as areas which could utilize the new technique.

With Unidar recording and other techniques, a spokesman said, access can be provided to desired data within an almost infinite data bank within four seconds.

The Unidar system can also be applied to any scientific data system where handling of a large amount of information is a problem, GD said.

While most current input capacities require a slower playback speed than recording speed, it is anticipated that, as computers are improved for very high speed data processing, they may be able to accept data rates directly from the Unidar system, the company said.

Meeting of Supporters Launches National Computer Year Plans

WASHINGTON, D.C. – Plans for the National Computer Year are finally getting off the ground.

A meeting here of the provisional coordinating committee for the National Computer Year last week established a seven-member ad hoc committee to formulate definite goals and an administrative organization for the National Computer Year.

The ad hoc committee is gathering comments on the proposals from the groups represented at the initial meeting of the coordinating committee and from other organizations which want to participate in the project.

The 50-member group *seemed* in general agreement with the broad objectives and the need for a National Computer Year, but felt more time was needed to formulate a definite set of priorities for the year.

As a result, no program for the year was adopted.

The major discussion at the planning meeting concerned the possible role of the Computer Science and Engineering Board of the National Academy of Sciences (NAS) in administering the National Computer Year.

Some, not a majority, felt that the board should be held responsible for planning and administering the effort. However, most representatives felt that there was a need for a National Computer Year regardless of whether this board had the resources or staff to plan and administer it.

As a result, the ad hoc committee will submit its plan of action to the 50-member provisional coordinating committee for approval and then will formally ask the Computer Science and Engineering Board of NAS to undertake the project within those guidelines.

If the plan is accepted, the ad hoc committee will disband and the project will fall under the province of the quasi-governmental Science and Engineering Board.

If not, the ad hoc committee will then be responsible for proposing an administrative structure for the National Computer Year to the coordinating committee.

Levin Files $750 Million Antitrust Suit

(Continued from Page 1)

may not stand.

All references to the 1956 decree, and an earlier consent decree, were ordered stricken from the combined suit in November [CW, Nov. 26].

All four plaintiffs had sought to base a major portion of their suit on alleged consent decree violations.

Judge Phillip Neville ruled that, since they were not part of the class intended to benefit from the decree at the time it was signed, the four plaintiffs were prohibited by law from attempting to enforce it.

Debt to IBM Is Overdue

The Levin-Towsend Corp. is currently in deep financial troubles, partly because of an $11.2 million overdue debt to IBM. Levin contends that the debt is the result of "illegal" policies of forcing the purchase, rather than rental, of certain hardware features or upgrades.

The suit charges that some of these features were only required temporarily, or would become obsolete, and that requiring their purchase for the "when-new price" is unreasonable.

Levin claims that his company has been required to purchase features and memory units from IBM ammounting to $17.5 million. He claims that this put an undue burden on the capital resources of Levin-Townsend and artificially inflated its indebtedness to IBM.

The suit also alleges that IBM's former "bundled" pricing of hardware and software and services constituted "illegal restraints and tie-in practices," and he seeks retroactive reappraisal of all contracts.

He also seeks to prevent IBM from collecting any money from Levin-Townsend under the "bundled" pricing structure, that is, any liability incurred before last June.

Additionally, the suit petitions the court to require IBM to rent certain features to purchasers of IBM equipment, "on the same terms and in the same manner as such features are rented to lessees of such equipment from IBM."

Both the Greyhound and Levin suits allege that the "intent" behind IBM's unbundling, IBM's 3% price reduction, and IBM's "unreasonably high" purchase prices for some equipment is to destroy competition in the lease marketplace.

Greyhound went so far as to say that unbundling destroyed its business.

Levin is apparently seeking the avoidance of such a situation.

He charges that IBM, "in the guise of a creditor concerned about the lateness of payments," suggested reorganization under Chapter Ten of bankruptcy laws, and that this suggestion was made to "disparage the company's solvency and to destroy its ability to obtain financing at a time when IBM was itself demanding payment from it."

He says that, unless his petitions are granted, the company will "suffer irreparable injury."

A spokesman for IBM said that company attorneys had not seen the complaint as yet, but "we believe it to be baseless."

A spokesman for Levin-Townsend had no comment.

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Old Tape—Late Tags

COLUMBUS, Ohio – An operator's error of mounting an old tape caused hundreds of Ohio drivers to be late in mounting new registration tags this year.

The old tape contained names and addresses of statewide motorists, but had not been updated with changes or new requests.

As a result, explained an administrative assistant in the bureau of motor vehicles, some motorists were late receiving their plates, while others received two sets.

City Loses Audit Trails, Attaches Disclaimer

(Continued from Page 1)

transactions.

The money was there, she said, "they just didn't know how to prove it in the audit."

GE–115

The city took delivery of its GE-115 last year around this time, anticipating conversion on Oct. 1, the beginning of fiscal 1970.

However, reported Edwards, city officials tried to get fiscal 1969 onto the computer, utilizing parallel runs wherever they could to aid the conversion.

Personnel qualifications were not what the city was hoping for, and the city also experienced the usual start-up troubles.

Edwards added that the auditors were not familiar with using a computer as a tool of their trade. Daytona Beach was the first municipality in Volusia County to computerize, Edwards added.

The city clerk praised GE's cooperation, and the end product from both hardware and software viewpoints. But, meantime, last summer was rather hectic in Daytona Beach, and, without close coordination with the auditors, the audit trails were lost.

Smoother Sailing Ahead

Edwards said that, starting this week, the auditing firm was scheduled to do a full analysis of the audit programs. This, in turn, is expected to require some rewriting to provide necessary audit trails within the programs, he said.

He added that, although the city's accountants and programmers could follow the funds, the auditors could not. Rewriting the programs will make the "back-tracking" of funds more obvious for the auditors, he said.

Zima also expects smoother sailing with this year's statement. He said Edwards was to provide the firm with a six-month "trial statement" for the auditors to prove and verify, using the new programs.

Any problems should be discovered and worked out, Edwards said.

Zima said that the disclaimer on last year's audit would probably remain forever, since it is written "with regard to their figures, and their figures aren't going to change."

He added that the "unidentified transactions will be totally immaterial."

Edwards agreed that to reconstruct the audit would be too costly, although he is not happy with the disclaimer.

Mrs. Meyer echoed: "It would be nice to have the notation that the differences were found and corrected, but apparently it's too time-consuming . . . no one likes to have this on their audit."

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10 Students Convicted in 1969 Computer Center Burning

(Continued from Page 1)

When the police arrived on the last day of the occupation, students threw printout, tapes, cards, and small pieces of equipment out the windows. When the police attempted to oust the students from the computer center, a Control Data 3300 was smashed with axes, and the computer center set on fire.

In all, 97 persons were arrested – seven juveniles and 90 adults. Of the adults, 41 were black and 49 white, 28 were not students, and 46 were not Canadians. Most of the blacks came from the West Indies.

Among those arrested was Cheddi Jagan, son of the opposition leader of Guyana.

The first 10 students to be tried for conspiracy were black and all from Trinidad. A jury deliberated for four days before acquitting two of all charges and convicting the other eight of only the lesser charges of conspiracy to obstruct. The eight were not jailed, but received fines ranging from $1,000 to $15,000, and the judge recommended deportation.

It was reported that the government of Trinidad paid all bail, lawyers' fees, and fines for the 10.

Two other West Indian students pleaded guilty to the lesser charges before a judge, and were fined $1,000. No deportation was recommended.

Also, six juveniles have been found guilty of mischief and fined.

Large Urban School

The university itself has expanded from a small YMCA college to a full university of 16,000 students in only 10 years. Some people charge that in its rapid growth, the school lost touch with its students and faculty, and that this fact was partly responsible for the sit-in.

The school is in two large buildings in downtown Montreal and has no campus. The computer center was on the ninth floor of the Henry Hall Building, a massive 12-story building opened in 1966.

Printout thrown from the 9th floor computer center streams off a street light.

One year ago, a computer center was destroyed; 97 persons were arrested and they are now coming to trial. The trials serve to reiterate that computers are extremely vulnerable.

DP managers are expressing increasing concern about security. In light of this, CW studied this case in detail. Our research shows that commercial installations are as likely targets as university centers.

In particular, the articles on these pages attempt to answer:

- Why was the computer center chosen as a target?
- Why was the computer destroyed, and could the destruction have been prevented?
- How did the center recover, and what protections have they added?

These articles by CW Staff Writer Joseph Hanlon are based on interviews with Sir George Williams faculty, administrators, and students, including several students who participated in the computer center occupation.

How and Why It Happened

A Case of Escalating Pressure

The computer center was a latecomer to the student protest, and was not related to the issue in question. Destruction of the center came only after steadily escalating pressure both by the students and the school administration. Some people feel that the destruction could have been prevented.

No one considered the computer center when the dispute began a year earlier. In April, 1968, seven black students charged biology Professor Perry Anderson with being prejudiced against them. In May, the dean of science considered the issue and rejected the charges, but the black students were not informed until September.

The black students, and some faculty members, tried unsuccessfully to get a rehearing. Feeling frustrated, the black students demanded Dec. 5 that Anderson be fired. Instead, the Sir George Williams Association of University Teachers set up a hearing committee consisting of two white teachers, two black teachers, and one Indian teacher.

The black students objected that they had no representation on the committee. In the following weeks, many meetings were held and the blacks occupied a dean's office for a short period. The hearing finally began Jan. 26.

Fearing trouble, the school administration moved its offices to an expensive suite of the Sheraton Mount Royal Hotel. On the second day (Jan. 29) of the hearing, trouble came. Approximately 400 students walked out of the hearing, held their own meeting, and occupied the 9th floor computer center in an effort to force the appointment of a new hearing committee.

School Ignores Sit-In

Contrary to student expectations, the university did not grind to a halt when the computer was shut down. In fact, the school ran normally, and after a few days the sit-in was nearly forgotten.

Frustrated by a lack of administration response, 250 students occupied the 7th floor faculty club Feb. 5 in support of the students still in the computer center. The students did not attempt to close the adjoining students cafeteria.

After 11 days (Feb. 9) of sitting-in, the students came up with a set of proposals that seemed acceptable to the administration. An administration spokesman accepted the student proposals and passed them on to the administration and faculty committees.

The students believed that the proposals would be accepted. They held victory celebrations and began cleaning up the computer center. But the administration viewed the proposals as only a beginning for negotiation and did not issue a reply until 10:30 p.m. Feb. 10. The students viewed this reply as a rejection, and the rampage was on. Each side escalated the conflict in response to the other, and within 18 hours the computer center was destroyed and 97 people were in jail.

By 2:30 a.m. Feb. 11, the students had emptied the 7th floor cafeteria of tables and chairs which they used to block escalators and stairs leading to the 7th floor. Fire hoses were turned on and water poured down the stairs. So far, however, the computer room remained closed off and the computer undamaged.

Cards Thrown Out Windows

By 5 a.m., the police had arrived and the students retreated to the 9th floor computer center and barricaded the door. Police sealed off the computer center, and the students responded by throwing cards, printouts, and small pieces of equipment from 9th floor windows.

Nothing more happened unitl 1 p.m. when riot police began to dismantle the barricades in an effort to oust the students. Several students set fires in the barricade and two offices, and smashed the CDC 3300 with axes. Protective panels were removed and protective glass broken.

The IBM 1620 in another room was ignored. The fire spread rapidly, and dense smoke forced the police and students to retreat. The students left the computer center by another exit and were arrested.

Destroyed keypunch.

The fire was extinguished an hour later, having destroyed most of the offices in the computer center. Although the fire did not reach them, heat and water destroyed the two computers.

Was It Preventable?

Some observers have argued that the destruction of the computer center could have been prevented by the school if it had been more willing to deal with the students. These people argue that by ignoring the students, the administration increased the students' frustration and forced them to increase the pressure.

These same people argue that if the administration had made some concessions, many students would have quit the sit-in, which would have broken the occupation.

On the other hand, some administration officials feel that the destruction was planned in advance and would have happened no matter what course of action was taken.

Aids Rebuilding

Luck Saved Most Software

Luck, combined with normal fire precautions, considerably eased the task of reconstructing the Sir George Williams University computer system.

Duplicate student record and payroll tapes were stored outside the building as a normal precaution against fire. Thus, the computer center officials were able to run payroll and a few other jobs on outside computers while the occupation was still in progress.

After the fire, the computer center was able to reconstruct most of its software, according to Prof. Graham Martin, center director.

Luck Aids Rebuilding

But luck, rather than protective measures, was the biggest factor. The entire tape library was saved, probably because it was in an out-of-the-way room and not noticed. The room had no heat protection, but surprisingly suffered no heat damage.

The demonstrators themselves inadvertently saved some of the programs when they threw printout and cards out the windows several hours before the fire.

Tape drive smashed with an axe.

Finally, some programs could be reconstructed from charred and waterlogged printout salvaged from the computer center after the fire.

But luck wasn't totally on their side: "We got caught with the program library tape on the machine," Martin said. And he admitted: "We surely didn't have the backup we should have had."

Computer center officials worked rapidly to resume operations. Within a week and a half, they had a time-sharing terminal in operation in another school building. Within a month of the fire, much of the software had been reconstructed and they were ready to take delivery on a new CDC 3300.

New Computer at Expo

But school officials were not about to risk putting the computer back on campus, and they soon found that landlords were not about to risk having the computer in their building. Montreal Mayor Jean Drapeau came to their aid, and a temporary site was found on the ground floor of the Canadian Pavilion at Man and His World, where IBM had set up a display during Expo 67. The Expo site was kept secret.

By June 1, the computer center was ready to move to a permanent site several blocks from the school. Many things are different, according to Martin. The office areas are split off from the equipment room itself, students no longer have access to the machine room and must use remote terminals, and the center has more backup.

Another. defense is psychological: by keeping the computer away from the school, "we are saying that the computer center is not part of the campus," Martin said.

"But our real defense," he declared, "is that we have shown we can run without the computer."

Why Students Picked the Computer

Computer Center Occupied for Bargaining Position

The students picked the computer center for a very practical reason – they felt it would give them the strongest bargaining position.

Contrary to popular opinion outside Montreal, the attack was not symbolic or Luddite. The students did not connect the computer in any way with depersonalization or the charges or racism. There were no statements about "we are only punchcards."

There are four reasons why the computer center was picked:

- The computer was a valuable hostage.
- Fear of damage to the computer would keep the school from calling the police.
- The computer was the "nerve center" of the university – students believed the school would grind to a halt.
- Inadvertently, the school suggested it by increasing security at the center in fear of a takeover.

Keeping the Hostage Alive

Students repeatedly referred to the computer as a "valuable hostage" and several times spokesmen for the group warned the school that if the police were called, the computer might be damaged.

But the hostage was only useful so long as it was kept in good condition. The students who occupied the computer center had no intention, initially, of damaging the computer, and they went to great lengths to keep it safe.

Until the last day of the occupation, the machine rooms were sealed off and nobody was admitted. Students regularly checked the temperature and humidity. A sign-in system was set up to regulate as access to the center.

'Machines Would Protect Us'

The monetary value of the computers was important to the students for another reason. "We felt the police would not be called in, because [the administration] would be afraid that in any commotion somehow the computer would be hurt," one student said.

The plan, she explained, was that if the police came "we would go into the computer room because it would be the safest place because the machines would protect us. If the police came, ... the plan had been that we would be around the computers, and any smashing the police would have done themselves. .... We felt we'd be safe with the computers; as long as they were unharmed, we would be unharmed."

Command Post

Equally important, the students viewed the computer as the nerve center of the school, or, in the words of one student, "the command post of the university."

They were convinced that the university would grind to a halt as soon as the students shut down the computer. But the students greatly overestimated the importance of the computer; classes continued and school ran almost normally. Even the payroll was not held up.

School Suggests Computer

Finally, the students occupied the computer center because the university unknowingly suggested it. The day before the occupation, the student newspaper published the minutes of a security meeting held the previous week. The minutes pointed out that two areas were particularly susceptible to damage – the computer center and the art gallery – and noted that security was being increased at the computer center. This was the first time that anyone suggested the computer center as a target.

Right up to the time of the occupation, there was disagreement among the students as to where to hold the sit-in. Many students advocated occupying the administrative offices in another building, but the computer center advocates won out. As one student explained: "In a way it was common sense; because of the extra security, the computer center must be important to the school."

'Not a Tool of Racism'

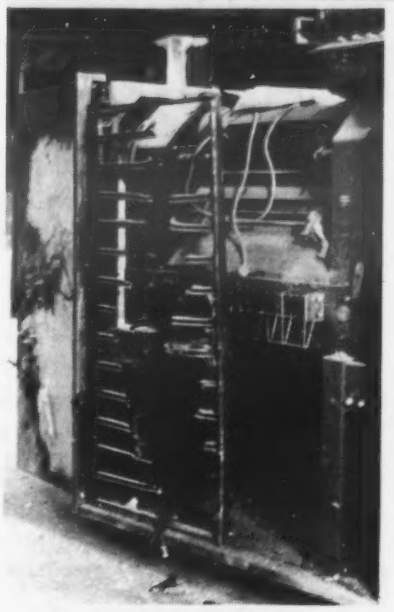
Thus, the students picked the computer center because they felt it would give them the strongest bargaining position, and because they felt it would protect them.

One black student who had participated in the sit-in told CW: "I cannot relate a white man to a computer. It is no more a tool of racism than a car.

"Even though I felt the administrators were machines," he continued, "I didn't identify computers with this. I didn't see computers in any way standing between me and the administration.

"Once or twice during the two weeks, people mentioned depersonalization as related to computers. But we ignored them. I wouldn't stay one minute longer because of that," he declared.

He concluded: "The computer represented the final blackmail. But it was just a piece of equipment, like an electrical transformer."



Destroyed printer.

Computers Hunt Houses

SAN DIEGO, Calif. – A San Diego Realtor, hunting a certain type and price house for a client, may now pick up a telephone, dial a Detroit number, tell a computer his problem, and then listen for the answer.

The computer will deliver the pertinent information such as location of house, size, interest rate, financing terms, and other facts in a matter of minutes.

FCC Is Faced With Over 25 Microwave Network Requests for Carrier Services

By Ronald A. Frank
CW Technical News Editor

WASHINGTON, D.C. – The Federal Communications Commission has received more than 25 network applications for specialized intercity common carrier services since initial authorization of this type was granted to Microwave Communications Inc. (MCI) last August.

The excessive number of applications, together with the interconnection questions which they raise, is presenting a real challenge to the commission in view of its somewhat limited resources, according to Bernard Strassburg, chief of the Common Carrier Bureau.

In a speech delivered to the North Carolina Independent Telephone Association, Strassburg discussed the microwave applications as part of an overall review dealing with interconnection demands in the 70s.

Strassburg said that as of April 14, 1,370 individual microwave station applications had been submitted with others expected. In a typical microwave filing before the FCC, each microwave site is considered a separate station requiring individual authorization.

The largest filing to date is the application submitted by Data Transmission Co. (Datran) for

Communications

approval of a 244-station nationwide switched network offering data transmission facilities between 35 major cities. The Datran net is intended to serve the needs of the computer industry, Strassburg said.

He said that although all the microwave proposals have not yet been evaluated by the commission, "it appears that none of the applicants has actually applied for local loop facilities or submitted concrete arrangements for interconnection."

The local loop question is considered critical to the proposed microwave services since most subscribers will be dependent on existing common carrier facilities to interconnect their data transmitting sites.

Strassburg said that during the commission's hearings for MCI to establish a Chicago to St. Louis link, the firm said it "did not propose to provide end-to-end service. The local loop between the terminal microwave station and the premises of the subscriber would therefore be furnished by the subscriber." He added that although some subscribers would provide their own local loops, most would have to rely on existing carriers.

In this regard, Strassburg said: "The telephone companies and Western Union, during [the MCI] proceedings, indicated that they would not voluntarily provide loop service to MCI's subscribers.

He said that the FCC retained jurisdiction over this issue and added that the commission "would issue an order requiring the carriers to provide loop service unless they showed that interconnection is not technically feasible."

Interest in 'Underware' Universal

Computer-Controlled Show Gets Curtain Calls in Asia

By Bernice Pantell
Special to Computerworld

DJAKARTA – A correspondent in Southeast Asia encounters many extreme situations. One minute he might be an uninvolved member of an audience seated at a show called "Triumph 70," in the Bali Room of the Hotel Indonesia in Djakarta.

And the next, he might be with pencil and writing pad in hand, hurrying to get into the projection room before the show started.

'Smashing Show'

The entire show was under computer control, synchronizing light, sound, and film with a bevy of beautiful women, in what was to be a smashing performance.

Very Little Room

But there just wasn't room in the octagonal room, two meters by two meters, which contained the computer, the program tape unit, the mixer unit, four power units and amplifiers, the main sound tape deck, the spare sound tape deck, eight projectors, the lighting control console, and four operators. All this in 22 sq ft of floor space, using all eight walls to capacity.

From the audience, one could see, up front, 23 incredibly attractive young models and dancers taking turns on a stage animated and lighted by computer, dancing and modeling ladies underwear to the accompaniment of synchronized soul, rock, country, pop and even classical music.

Speaking of extremes!

Ladies Underwear

More than a year ago Triumph International (ladies underwear, honest) asked three young electronic engineers in Munich, Germany if they could come up with a computer to do all this for a special show the Viennese manufacturer was putting together for Expo 70.

They could and did, six designing months and 7,200 building man hours later. They built the 22-sq-ft projection booth for themselves and the lighting director. The whole thing can be assembled and ready to go in three hours, and can be repacked neatly for plane travel.

And travel is the word. The show started in Austria (home of Triumph International), went through Asia to Japan and is now going through Southeast Asia to its final performance in Karachi. Before it is finished, it will have been seen in more than 30 countries.

Kleiner, Mietzner and Mattis,, who built the Mesto computer system for this show, are well aware of the remarkable qualities of their equipment. It is not only compact, but it can be broken down and set up repeatedly with no ill effects, and it performs from -30°C to +70°C; it is modular (capacity up to 100 film projectors), and it is adaptable to other jobs. The Mesto can be used for any synchronized "steering" purpose: light, sound and machine, or any combination.

Mesto is at 8 Munchen 60, Veldenerstr 82, West Germany.

Many people have shown interest in this computer already. In Taiwan, for instance, Astronauts Conrad, Gordon, and Bean were among its admirers. Mietzner was delighted that one night Bean came, the second night Gordon and Conrad came, and the third night they all came.

Anyone else would have come back for those 23 beautiful girls, but astronauts are dedicated professionals, and they are well informed about the developments in the fast-breaking computer world.

Do You Need a Phone Book? I Have Several

HELENA, Mont. – The familiar game of "Blame the Computer" was played here recently, when a "mailing computer" caused multiple delivery of telephone books.

The local business manager of Mountain Bell, Gary Decolatim, explained the "fault of the mailing computer" as double-processing of the mailing tape.

The human error was followed by explanations in the local papers about a "big gray computer" losing its head.

Claims Traced

BOSTON – The Massachusetts Registry of Motor Vehicles is using its GE-435 to reveal motorists who have filed motor vehicle insurance claims without reporting accidents to the authorities.

The system matches insurance claims with accident reports, which are required within five days of an accident causing injury or damages over $200.

Registrar Richard E. McLaughlin said that alleged violators would receive written requests to submit reports. Failure to do so would result in hearings, and revocations of licenses or registrations could follow.

Computers Trace Freight

COLUMBUS, Ohio – Emery Air Freight has installed a computerized air freight handling system that will enable it to check the exact location of shipments at any time. It does tracing, routing, billing, scheduling, manifesting, and consolidating.

Editorial

John Henry vs. the Computer

The computerized Internal Revenue Service has created a modern sequel to John Henry vs. the Steam Engine. It's called John Q. Taxpayer vs. the Computing Machine.

The rules of the contest are incredible:

Make the taxpayer pretend he's a computer, a role for which humans are generally ill-suited. If he doesn't abort during the "run," reprocess the data by computer to see if his output is accurate. If he made a mistake, make the human reprocess a large portion of the data a second time.

In effect, the computers are debugging the humans.

Why, in heaven's name, don't we play the game properly?

Let the taxpayers fill out a form which simply lists income, deductions, and exemptions. This is the easiest part of the job.

The taxpayer would then send this "input" form to the IRS, which would feed the data to the computer for computation. The results would be entered in the taxpayer's file and a detailed printout sent to the taxpayer.

If the taxpayer agreed with the results, he would simply send the signed printout back to the IRS for a refund or together with his check for the amount still owed. His file would be updated accordingly, a simple entry.

If the taxpayer disagreed with the computer's calculations, or if the computer had spotted some questionable input, the taxpayer would fill out a simple form, indicating the changes, and send it to the IRS for a refund or together with a check.

Frankly, in addition to all the agony of manipulating the data by hand, the thing we like least about the present system is that the machine is checking on the man, instead of working for him.

'This Time I Won't Have to Worry About a Hotel Room'

Letters to the Editor

Ad Hoc Education Committee Not an Afips Organization

An error [occurred] in your final editing of my remarks on "EDP Education and Manpower Needs" on page 44 of your April 15 issue. The ad hoc committee on EDP education *is not* an Afips committee, although Afips is chairing the group at this time.

The committee, formed through the auspices of the Business Equipment Manufacturers Association, is an autonomous body whose sole interest is cooperative efforts aimed at improving EDP education at levels below four-year colleges. Any guidelines or other material produced by the committee will be carried out in this spirit.

In the case of uniform guidelines, the major portion of the effort is being expended by ACM and DPMA, which have already devoted a tremendous amount of work to this area. Ultimate credit will rest largely with these two bodies and certainly not with Afips, although we are appreciative of the opportunity to act as a catalyst in this project.

Thomas C. White
Director
Public Information

American Federation of
Information Processing Societies
Montvale, N.J.

Close Communications Between Manager and Programmer Needed

With reference to the article "Programmers Hit at Symposium" [CW, April 8], I must make strenuous objections to the comments made by Dr. Hamming and Dick Brandon.

Many programmers are not illiterate, and we do know what our fellow programmers are doing. We work with our user departments not just providing the same information as the manual system, but adding validity checks and cross-checking input data with master files which in turn are constantly being edited for errors. In short, when middle management and the programmer get together and communicate, then *garbage in* means *garbage rejected*!

If a company is foolish enough to hire unproductive business programmers and pay too much money, then that is their fault. There are plenty of salary surveys by city/education/experience to show how much a programmer should be paid.

David Curtis
Senior Programmer/Analyst

National Gypsum Co.
Buffalo, N.Y.

Computer Couldn't Know Input Was Faulty

A front page headline on your March 25 issue began: "Calculated Computer Errors Manipulate...." The third paragraph, however, explained that the input was purposely miscoded and there there was no computer error. This type of check-kiting was performed before computers were used by the banks. All that was required then was a note on the ledger card to pay against uncollected funds.

I am surprised to find *Computerworld* guilty of the misleading headline crime!

R. Peter Ericson
Director of Hospital Automation

Institute of Living
Hartford, Conn.

The intended point of the story was that although a human being might spot this kind of hanky-panky, a computer will only double-check such items as it is instructed to. There is a clear warning here that humans may take advantage of a computer's "blind spots." Ed.

APL Praised as Educational Tool for Mathematics Students

For three years, our public secondary school has been using a terminal time-sharing system for instructional aid in the mathematics curriculum.

The advantages to the use of time-sharing on the high school level are almost countless. However, I feel that a large degree of our success is attributed to the use of APL.

In comparision with others, we have found APL to be highly mathematics-oriented, powerful, compact, clean, and easy to master. Students use the terminal in a variety of ways ranging from CAI material to drills, games, labs, simulations, problem solving, and remedial work. Furthermore, the ease with which students are able to program simple to sophisticated programs is amazing.

My praise goes out to Dr. Iverson and staff at IBM for this gift to the educational system.

Kevin R. Weaver

The Morgan School
Clinton, Conn.

Simscript II Was Developed By Rand Corp. Employees

In the article on Simscript II Plus in the April 1 issue, the first sentence states that Simulation Associates, Inc. was the developer of the earlier Simscript II, which is not correct. Simscript II was developed by Philip J. Kiviat and Richard Villanueva while employed by the Rand Corp. Both are now with Simulation Associates; Kiviat is president and Villanueva is director of Simscript II Plus development, but the company was not in existence at the time the original Simscript II was developed.

Arnold Ockene
Vice President

Simulation Associates, Inc.
White Plains, N.Y.

Let's Look on the Positive Side—Where Profits Lie

The Taylor Report

by Alan Taylor

Last week I commented about how solutions to throughput problems have to take second place, in a manager's mind, to knowing that they will be suitable for his operation – the "guarantee before dollars" syndrome. In doing this, we raised the question as to how a computer run should be described, so as to allow a manager to see if he can get the desired improvements. We showed a chart (figure 1) of a printer-dominated run.

In this particular run the point of the illustration was that it didn't matter about where the central processor time went – because it wouldn't affect matters. Now that was essentially a negative point, which isn't particularly interesting in itself. However, by turning the coin over and looking at the other side, it can also illustrate the positive point – just where does the profit lie?

Look Again

Take another look at the figure, so as to see what possibility exists, in obtaining a profit from a possible improvement.

To start with, the area above the printer is clearly a potential profit area. The printer is only working 90% of the time. It could be working all the time, and save that 10% area. So that is profit area No. 1. We call it the "Wastage Area."

It may not appear that it is worth looking far to save the 10% of the time that the printer isn't working. And this is sometimes a true statement. There are cases where it is simply not worth picking up the wasted time. It is necessary to consider how frequently the job runs. Theoretically, however, any wastage is available for picking up and at the moment we are looking to see what areas are worth picking up.

Alan Taylor, consultant, writer and former editor of *Computerworld*, is president of Computer Management Aids Corp. of Framingham, Mass.

Like Niagara Falls

The next area is what we call "The First Cascade." If you rearrange the chart so that the percentage utilization of the various components falls in order of frequency, it looks rather like a waterfall (see figure 2). Different arrangements look different – just like different waterfalls do. Sometimes it looks like a Canadian falls at Niagara (figure 3) with a straight fall for most of the way down, sometimes, like the American Falls (figure 4) with only short falls. But however it looks, it has character.

From the profit maker's point of view, there is as much difference between the characters shown by Figures 3 and 4 as there is in a tourist's mind between the Canadian and American Falls. To the profit maker's viewpoint (like the tourist's), he finds something with a beautiful first cascade very attractive!

More $$

The reason is that this is a second area where a profit can be made. In this area only the dominant unit is operating. The reason that this is so attractive is because a program improver needs to deal only with one variable. If it is a printer-dominated case, as in Figure 1, then he immediately turns his attention to the printer and happily ignores everything else. If it is a central processor dominated case, then he can turn his attention to the central processor, and practically ignore everything else.

These then are the two positive areas to look for to obtain program improvements. There is the wastage area, which is the area above the dominant unit's usage and spreading up to 100%, and there is the first cascade which is between the first unit and the next-to-dominant unit.

Both are worth working on – but which do you think is simplest to attack? We'll talk about that next week.

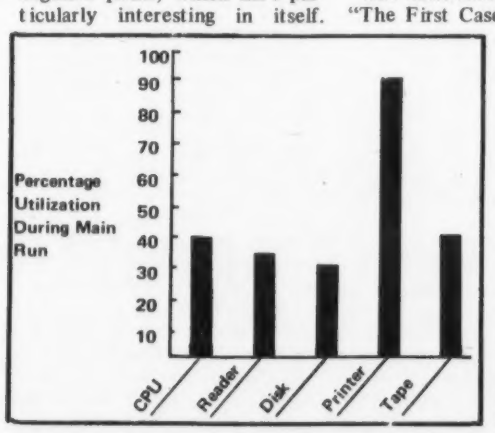


Figure 1. Sample run showing utilization of major components. Note that none of the units need be operating all the time, so that the description of such a run as being "Printer Limited" is incorrect. It is correct, however, to refer to it as being "Printer Dominated."

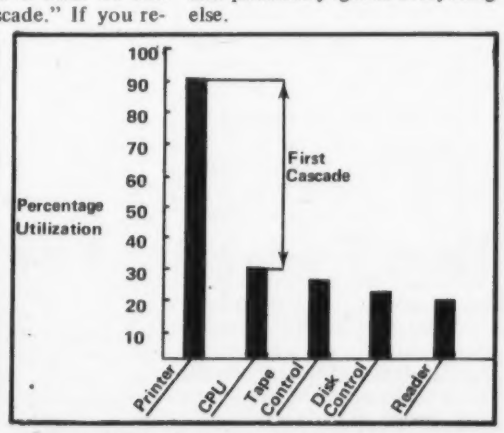


Figure 2. The First Cascade Case. If a bar chart is made of the various percentage utilizations, and ordered in order of utilization, a diagram like the above is made. The percentage by which the most used (or dominant) unit exceeds the utilization of the next-to-dominant unit is called the 'First Cascade.'

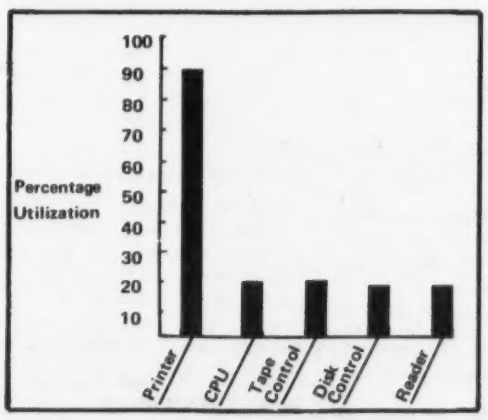


Figure 3. A High Cascade. Where there is a difference in percentage utilization of more than 40% between the usage of the dominant and next-to-dominant units, the utilization pattern is called a 'High Cascade' because of the appearance of the bar chart.

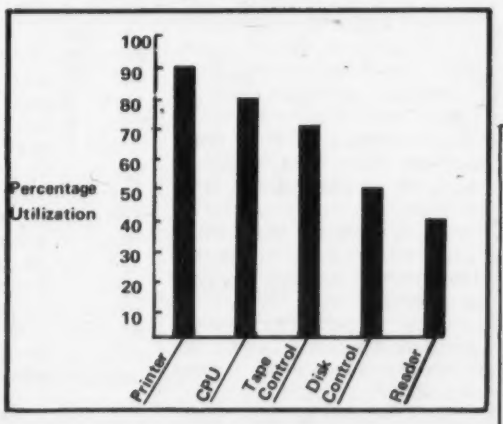


Figure 4. A Low Cascade. Unlike Figure 3, in this case the most-used unit, and the next to most used one are not very different in terms of percentage utilization. By analogy, such a pattern is called a 'Low Cascade.'

Programmers Win The Patent Battle

In a recent report on the software patent scene [CW, April 8], *Computerworld* mentioned the case of Bernhart and Fetter. The article explained that it had been missed by the press although it actually occurred last November. It went on to point out that the case was a milestone because it achieved protection "for a process which might be able to be done mentally but which was principally accomplished on a digital computer."

Now this is a milestone, and it is very interesting to inventors who realize the usefulness of computers. In this case it is nice for mathematicians who have discovered a mathematical short-cut. In the case, the court held that while mathematical laws cannot be patented, if you find a mathematical short-cut that is "new, useful, and unobvious" and if you have all the rest of the necessary criteria, why then you can have a patent.

A "Math Short-Cut, Si, Math Laws, No!" sort of situation, which only short-changes the Newtons.

Heart of the Case

But the court also said a number of other things, and one was very interesting to programmers. The basic question has always been, "if a programmer writes a really cracking good program, can he get patent protection for it?" And until now the questions the court has been answering have been in regard to whether people who are basically nonprogrammers are going to have their patents voided simply because they used computers. A very interesting question, but only of subsidiary interest to programmers.

Sometime ago a presidental commission tried to ban any patent from being issued for computer programs. It almost became the law of the land without it being realized to be a fraud on programmers. The Patent Office continued to refuse to consider any programmable process.

All that Prater and Wei and the other cases did to change this was to make the Patent Office allow you to get a patent if you used a computer as long as you did it nicely. Which did not help the programmer. Now this has apparently changed.

As a part of the Bernhart-Fetter decision the court held: "if a machine is programmed in a certain new and unobvious way, it is physically different from the machine without that program; its memory elements are differently arranged. The fact that these physical changes are invisible to the eye should not tempt us to conclude that the machine has not been changed. If a new machine has not been invented, certainly a "new and useful improvement" of the unprogrammed machine has been invented, and Congress has said in 35 U.S.C. 101 that such improvements are statutory subject matter for a patent."

And That's That

As long as this is the official position, there seems to be no doubt that a useful program in a machine is a new and improved machine and can be patented. There doesn't seem to be anything else to be said. The programmer has won his case.

And about time, too. The whole idea that computer programs should not be allowed to be patented in appropriate circumstances made programmers second-class citizens, while leaving the computer manufacturers quite happy. It was a simple robbery of the programming profession from first to last. Thank goodness the courts have been there to protect us.

Part of Total Picture

Woman Terms Computer Industry 'Feudal Hierarchy'

By Joan Dublin

Much has been said in the three months of this decade about women and liberation. A great deal remains to be said, and, more importantly, done.

Women in the computer field are comparatively well paid, and have potentially more interesting jobs than our sisters who are channeled into secretarial or housewife roles.

But is this enough?

The computer field now looks like a feudal hierarchy with a large number of women in keypunching and lower level programming jobs at the base of the pyramid.

It is extremely difficult, if not impossible, for keypunch operators in most companies to be trained and promoted to programming or operation positions. Women programmers or systems analysts rarely have the opportunity to enter into managerial positions.

But this is just a small part of the problem, for those women who do manage to arrive in positions usually held by men are more frequently than not given lower salaries.

Insulting Attitude

The promotional campaigns of the industry also reflect an insulting attitude towards women. At the recent Compso East show, one saw only carefully suited "business men" and a gathering of show business bunnies beautifully mini-skirted to attract attention to the products the men were selling.

Trade publications often contain advertisements showing women, of course partially dressed, with the latest hardware or software gimmicks.

Is this the industry's opinion of the proper place for women?

Problems Complex

The problems of women in this field, or any other, are too complex to be solved by a simple call for equal pay and equal job opportunity.

It is becoming clearer to women, certainly, and to some men, that women will not be satisfied with the dual role of job and house/husband/child care.

Viewpoint

For many years businesses did not want to hire the career woman with a family, for after all she would have to take time off when the children were sick or other matters needed her attention. Many women chose, and are choosing, not to take additional job responsibilities because they have a family.

But there appears to be no clear-cut biological reason why a sick child or a dirty house are women's work.

Unfortunately, as business finds it more and more profitable to hire and promote women, the larger issues of role-playing and family structure may be submerged.

Since the beginning of the war in Vietnam a growing number of women have entered the computer field in place of men who were not available on the job market.

Today most businesses are faced with a severe shortage of middle management because the bright eager men of the 50s and early 60s have chosen to drop out or follow other paths.

Within a few years I am sure we will see these positions filled by women. Not because business will have become more understanding of women's liberation, but because it is economically satisfying to the corporate structure.

These problems illustrate why we believe that any isolated demand such as day care centers, equal pay, and equal opportunity will fall far short of a redistribution of the family-oriented roles in this society. Of course we will continue to fight for these necessities.

Computer Field Must Lead

The computer field must take the lead in training and promoting opportunities for women if it is going to continue to grow.

Women have a long way to go to attain equality in an economic sense, and a far longer way to social and political liberation.

Joan Dublin is a member of the Women's Caucus, Computer Professionals for Peace, New York.

Art Strickland

You Say Dayta, and I Say Datta

Man's little language prejudices have always caused him difficulties in communication, but I believe one quirk of phonetic 'phate' is especially significant for us.

I refer to the fact that the data processing community cannot agree on how to pronounce its first name, *data*. How do you pronounce it? With a long *a*, *dayta*, or with a short *a*, *datta*?

Good Guys vs. Bad Guys

Whichever way you've chosen to go, I'll bet you feel at least a tinge of annoyance every time you hear your conviction violated. In fact, Dr. Wilhelm Schrinke, in his treatise "The Analytical Psychodynamics of the Computer Guy," states categorically that "every computer guy maintains the unconscious fantasy that he can separate the good people from the bad by the way they say data."

Now that's a pretty categorical statement, and I gave it no credence until I overheard the following conversation between two systems analysts.

"I don't think there's anything wrong with the program, Jim. I looks to me like bad datta."

"That's what I thought. But I've checked the dayta myself, Fred. I can't find a single error."

"Anyway the program checks for bad datta, doesn't it?"

"It's supposed to, but I did a test run with some deliberate dayta errors, and it didn't catch them all."

"That's nonsense, Jim. I wrote some of those datta editing routines myself. Let me see your printout."

"Okay, if you don't believe me. Here it is."

"Alright, which piece of datta is wrong?"

"Well, take this daytum, for instance. It's not even the right length. The program just took it as part of the next field, which isn't even supposed to be numeric!"

"For crissake, Jim. You know Fortran can't tell what's in an alphanumeric field. And according to your input specs, this is just descriptive stuff anyway. Technically, this datta is not in error."

"*These* dayta are critical to the user of this report. They must be checked for reasonableness. Why don't you come back when you've got it right?"

"I say it's bad datta."

"It's the program."

"Datta."

"Program."

"Datta!"

"Dayta!"

"What!!?"

"Dayta! Good dayta, Mr. Brooks!"

Magnitude of Problem

An extreme case? Maybe so, but just to get a feel for the magnitude of the problem, I went to see the noted etymolgist Dr. Jules Definitive, whose scholarly works are familiar to all. As usual, I found him sipping a glass of Benchmark and slightly out of plumb.

"Dr. Definitive, I've been a little concerned about 'datta' lately, and I wondered if you might shed some light on it."

"Oh, my, yes. Concern for dayta is quite common in the dayta processing business these days. But with the new photo-electric card readers there is hardly a need to shed more light on it," he chuckled.

"But I mean the word datta. I'm wondering what communications barriers result from the difference in pronunciation. Have you given it any thought?"

"What's to think about? The word is pronounced dayta. Of course there are those ignorant dummies who say datta, but they are in the minority, and one can easily overlook it."

"I don't want to seem argumentative," I answered, "but I've done an informal survey, and my datta show that only 55% of the population says dayta. That's hardly a great majority."

"Did I say a great majority, meatball? A majority is a majority. Now take my word for it, people don't even notice. Why, I once heard an IBM executive say 'datta proecessing.' He mispronounced them both, and he's still an IBM executive."

"But that's just my point, sir. People don't always know why they're annoyed. But they *are* annoyed, and communications break down."

"Ha! You've been reading that vacuum tube Wilhelm Schrinke, haven't you?" Then he muttered into his glass, "That idiot says datta, and he doesn't even care."

"Dr. Definitive, wouldn't it be better for the whole datta processing community if a learned authority like yourself were to come out for one or the other?"

"When three out of seven are parity checks like you? Do you think I have nothing better to do than waste my time! Besides, I just said it doesn't matter how people pronounce it."

To Eliminate Problem

Now who am I to dispute Dr. Definitive? I've simply decided that only by individually working for better understanding can we, the computer world, eliminate this most common of communications problems.

I'm willing to make my contribution. As for me, I'm going to teach my kids to say datta, by God, and to overlook it in those who don't.

Only the Computer Knows

AKRON, Ohio – A computer installed in London to record traffic cases demands the offender's date of birth. But a court official says if a lady doesn't want her age known publicly, it can be held in confidence.

Swedes Want More

STOCKHOLM – Sweden is Scandinavia's leading user of data processing equipment.

It has 500 computers in operation worth about $200 million, an additional 250 on order, and an estimated 1,200 are expected to be in operation by 1975.

'Infomacs' Prepares Reports for IBM 360 DOS Users

By Don Leavitt
CW Staff Writer

PHILADELPHIA – IBM 360 users operating under DOS can prepare reports, create test files, or display suspected problem records by using Infomacs, a "control-card language" available from Management and Computer Services, Inc. (Macs).

Infomacs allows reading and writing of fixed- or variable-length tape files as well as reading and writing of sequential or index-sequential disk files on 2311 or 2314 drives. Output files are created in the same organization form and device type as the input file.

Infomacs has no means of handling card files directly, but a card-to-tape utility run would put such files in a form that the system could use, the company said.

Report Features

Report features of the Infomacs system include print editing, subtotals, page skipping, and packed field processing. As a report generator, Macs said, Infomacs may use 70% fewer cards than RPG.

With Infomacs, the basic control card identifies the input file and the purpose of the run: searching for specific data, data between limits or for specific data regardless of sequence; processing all records; or checking for wrong-length records.

Field accumulation and record formatting is handled by the field selection and several subsidiary cards. Macs said that up to 30 fields may be selected and that a maximum of 10 fields may be accumulated with four levels of totals, plus a grand total.

Simple Concepts

Written in Assembler language, the Infomacs system is available in two versions, 32K or 65K. The package can be used on all S/360s from Model 25 up, under DOS.

Cost of the system is $2,800 with a 20% discount allowed on additional installations. Infomacs includes training in the system price, but Macs said that the concepts are so simple that they have actually "installed" the system through the mails. An Infomacs manual describing the control in detail is included with the package. The system is available for immediate delivery.

Management and Computer Services Inc. is at 104 Park Towne Place East.

Realtime Adds Interactive T/S Service Used with Burroughs Command Language

NEW YORK – An interactive time-sharing service has been added to the on-site and remote batch-processing capabilities previously available through Realtime Systems Inc.

The service includes a library of statistical and financial analysis programs which can be used through the Burroughs command language.

Realtime said that its personnel will be available to help design programs to meet specific needs. More sophisticated users can use their own problem programs, which can be written in Fortran, Cobol, Basic, or Algol, a Realtime spokesman said.

The service is based on a dedicated Burroughs B5500, soon to be replaced by a B6500. Users can gain access through a wide choice of terminals, including Teletypes, CRTs, the Burroughs TC500, the Victor 820 minicomputer or even a 360/20. This latter machine, the company said, might be appropriate if users were also utilizing Realtime's remote batch processing capabilities in addition to the new service.

The command language in the Burroughs TSS Master Control Program allows the use of common English terms and will indicate to the user any errors. Because of a text-editing feature in the language, programs and files can be quickly corrected, the company said. The computer can be directed to change a specific item on a given report line, or to search a file for all entries of a specified nature and to change those entries according to instructions.

In addition to financial analysis and statistical programs, Realtime said that the present library includes forecasting, Pert time and cost studies, simulation routines, and the Dynamo package.

After simple recompilation, problem programs written in high-order languages can be used on either the remote batch or the interactive time-sharing systems, said a Realtime spokesman. Although the internal machine language of the Burroughs equipment differs from other computers, the I/O tape files are completely compatible with the S/360.

Available now, the time-sharing service will cost the user an initiation fee of $100. Spokesmen at Realtime are reluctant to cite monthly minimums or usage charges because of the forthcoming changeover to the B6500, which they expect will radically alter the time demands of users.

Realtime Services Inc. is at 866 Third Ave.

Nova/Supernova Software Includes DOS

SOUTHBORO, Mass. – Aiming particularly at scientific users, Data General Corp. has developed an Algol compiler, two variations of Fortran IV, and a disk operating system for the Nova/Supernova minicomputers.

According to the company, this package, with its high-order language capabilities, will allow the minis to operate like general-purpose computers.

The software package is the first public acknowledgement of new hardware capabilities. The disk operating system will utilize a fixed-disk unit, which is now being shipped to customers. In addition, a disk-pack unit is under development and a tape unit, controllable by the DOS, is scheduled for delivery later this Spring.

Data General says that the Algol compiler will be a full implementation of Algol 60 and that extensions will also provide for manipulation of character strings, or alphabetic information. Unlimited precision arithmetic is said to be another feature of the compiler.

Two-pass Compiler

The current version of the Nova/Supernova Algol will be a two-pass compiler that generates optimized assembly language code. A feature that would automatically generate comments on the assembly code list, in order to describe data movement, is expected to be added to the compiler.

Another, more advanced version of the compiler, which will convert Algol source statements directly to machine code, is presently in development, the company said.

Of the two variations of Fortran in the package, one is described as a full Ansi Fortran IV. Extensions are said to handle mixed mode expressions, provide dynamic storage allocation, allow generalized subscripts, and handle variable names with any number of characters. The Fortran system will generate assembly language code compatible with the Algol output and use the same run-time library. Thus, the company noted, a user will be able to use one higher-order language to call up another in the course of a program.

The other form of Fortran will be Ansi basic Fortran IV, a high-speed, single-pass system that generates interpretive object code. It will sacrifice some of the features of full Fortran in order to gain the faster compilation process, Data General said.

Novice Oriented

With their disk operating system, Data General said they have built a system that is both readily usable by the novice and flexible enough for the more sophisticated user. Device independent, programs written under the Nova/Supernova DOS will reference files symbolically; these may represent any I/O device, the company said. Identification of the specific device occurs at execution time.

Also featured is a file structure that will allow files of unlimited length to be organized for either random or sequential access.

The company said that under the DOS, all commands will be files, thus allowing the sophisticated user to add commands at will.

The company said that the new software will be available without charge to users. The Algol compiler and the DOS are expected to be ready for delivery in June, the Fortran systems in July.

T/S System Geared to Contractor Needs

DENVER, Colo. – A complete system of time-sharing programs for the construction industry has been developed by Applied Computer Timesharing (ACT).

Comprehensive in scope, the ACT system is modular in design. Users can choose programs for "everything" from job cost estimating to corporate accounting. A scheduling program utilizing the critical path method; payroll; and cost control programs for labor, material, equipment and subcontracts are also being built. The "normal cost" figures are based on current material prices and wage rates keyed-in by the estimator. The system allows the estimator to override any of the generated included in the system, the company said.

The estimating program develops a quantity survey and "normal cost of construction" figures for each item on the survey. ACT said the quantities developed include material for forms and similar auxilary work as well as the project actually "normal costs" that are incorrect.

ACT's labor cost analysis produces a report showing estimated and actual costs by activity within each job. The payroll costs are posted automatically to this system from the payroll programs. ACT says that the only data that has to be manually entered to generate a report are the current percentages of completion for each activity. Options include printing only those codes that were active in the reporting period and/or basing the report on labor units rather than percentages of completion.

After an initial fee of from $1500 to $2500, depending on their distance from Denver, users of the ACT construction programs will have no monthly minimum billing but will face usage charges only. Company spokesmen are reluctant to spell out these charges, noting that since each contractor's needs are different ACT would rather develop an overall estimate of monthly costs for each prospect user after reviewing his particular situation.

Applied Computer Timesharing is at 4700 South Forest.

"Honey, I Have a Confession to Make – I'm Really a Software Recruiter – But I'll Still Marry You to Sign You Up . . ."

Computer Time Sharing Developed Autodoc

The CW article [CW, April 8] describing the Autodoc software service being offered to users by Applied Cybernetics Corp. did not mention that Autodoc was developed by Computer Time Sharing Corp., Palo Alto. Calif. Applied Cybernetics, Sunnyvale, Calif., is currently leasing Autodoc from Computer Time Sharing.

Financial T/S Services Include Corporate Planning

NEEDHAM, Mass. – Corporate financial officers with access to time-sharing terminals can use K/Map and K/Merge, a financial planning service developed by Kenmore Management Associates, Inc. (KMA).

The developer said that users need no specific knowledge of computer technology and that with this service they have all the tools necessary to create a viable, realistic financial plan.

KMA said that the system uses a data base made up of a current balance sheet, tax rates, fixed and variable expenses, and corporate policies such as minimum and maximum cash balances.

With this type of input users can test the effect of proposed financial changes. KMA said that, typically, a planner might enter a change in planning guidelines, a revision of his capital structure, or a change in the timing of a large disbursement or loan. At any time and for any periods, KMA said, the user can obtain a complete set of pro forma statements reflecting the proposed change.

Present plans call for the K/Map and K/Merge to be available only through time-sharing services, but KMA said that it would consider a sale-license arrangement with any large user. K/Map is written in Basic while K/Merge is in Fortran IV. The packages have been adapted for use on GE-635 and 435s, the DEC PDP-10, and the XDS 940.

K/Map has an initiation fee of $500. The start-up fee for K/Merge is $250. Running charges for the packages are $80/hr for the first five hours of connect-time each month, and $50/hr thereafter. There is a minimum monthly charge equal to the charge for one hour, regardless of actual use.

Kenmore Management Associates is at 629 Highland Ave.

Brown Packages Help OS/MVT Users

WESTPORT, Conn. – Two packages, developed by Brown University to enhance the operation of S/360s under OS/MVT, are available through Hygain Technologies, Inc.

The packages provide complete system management application and total interactive time-sharing capabilities for Models 50 and up, the company said.

Hygain said that Sysmac, the management package, screens incoming job requests, determines the basic acceptability of the request, and if accepted, assigns the job a priority in the execution queue.

Once the job is operational, Sysmac is said to monitor up to 12 S/360 activities including all I/O functions and actual CPU usage. With this type of surveillance, Sysmac is able to bill the user for the precise computer resources utilized by each job, and to produce four types of accounting reports, according to Hygain.

The second package, Systel, has two sections: the Bruin interactive language, and the time-sharing coding itself. Hygain said that Bruin can be used with any S/360 time-sharing system and, therefore, is available separately from the time-sharing coding portion of the package.

Systel requires 64K storage, according to Hygain, while the Sysmac package needs only 600 to 4K core positions to function. Both make use of the disk that is required under OS/MVT.

Company spokesmen said that both packages are presently available and can be installed "within 10 days." Sysmac is priced at $4,900 plus $49 monthly maintenance charge, on a perpetual lease arrangement. On a rental basis, it costs $230/mo which includes maintenance.

The full Systel system costs $6,800 plus $68 monthly maintenance, or $320/mo including maintenance on a rental plan. The Bruin language portion of Systel sells for $3,900 plus $39 monthly maintenance.

Hygain Technologies, Inc. is at 65 Whitney St.

'Optran' Users Can Select Optimization Algorithms

WEST LONG BRANCH, N.J. – Research labs looking for solutions to parameter optimization problems in either interactive or batch mode of operation have a new tool to consider in Optran, developed by Electronic Associates Inc. (EAI).

The developer describes Optran as a command-structured, free-format language in which the user can select one of a variety of optimization algorithms.

According to EAI, Optran user options include input basic data and problem specifications, selection of initial values of parameters used, selection and alteration of particular algorithms and the generation of reports describing the mathematical model or objective function output for particular parameter values. The complete Optran system contains over 100 subroutines, and it has been used to solve problems ranging from biomedical research to inventory control, the company said.

Written in Fortran, Optran operates on words of 32 or more bits. The developer has geared Optran to the IBM 1130 and 1800 and EAI is now adapting it to the 360/40 and up, with a minimum of 32K memory locations (32-bit word length): four tape drives are required to operate the system.

An EAI spokesman said that Optran can be purchased for $13,000 installed, including development of six programs. The package is also available on a monthly payment plan, with details to be worked out between user and developer.

Actual installation schedule depends on the user's machine, said EAI.

Management T/S Package Provides Hard-Copy or CRT Display Readout

PHOENIX, Ariz. – Accountants using Computer Library Application Service (Clas), a time-sharing financial management package from Western Data Sciences, have the option of either hard-copy or CRT display readout.

The developer said that Clas now includes a general ledger system, a cash investment analysis, and several utilities for file handling and storage. Other segments of the package, including payroll accounting, are said to be in an advanced state of development.

Remote Batch

A remote batch-processing version of Clas is also expected soon, a Western Data spokesman said.

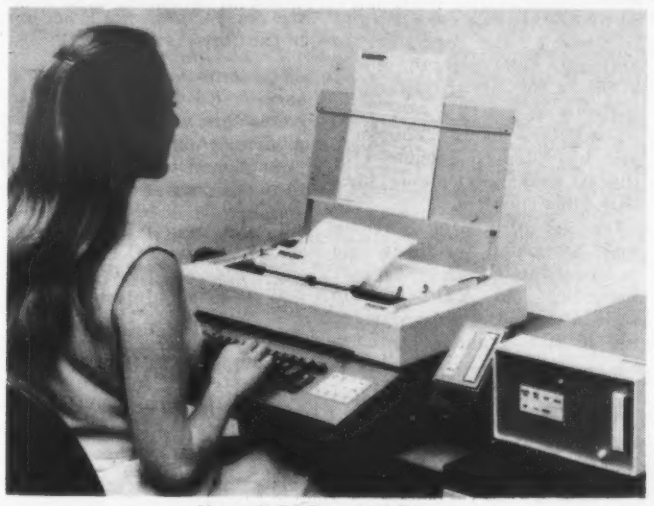
Manuals for Clas users avoid computer technicalities and are written in terms familiar to accountants. Guided by these handbooks, users are able to prepare, in less than half an hour, reports that might otherwise take 10 days or more to put together, the company said.

Available in either Fortran IV or Basic, the Clas programs have been implemented on an XDS Sigma 5, utilizing about 14K memory, and Viatron terminals. The system is also operational on a Hewlett-Packard 2000A with teletypewriters. The system requires the full 5K memory of the HP 2000A.

Fortran IV or Basic

Western Data said that the normal lease arrangement under which time-sharing services use Clas calls for an annual fee of $900 plus a percentage of the revenue generated for the lessee by Clas.

Western Data is at 3550 N. Central.



Novar 5-51 Terminal Printer

Novar 5-51 Combines Computer Entry With 240 Char/Sec Speed

MOUNTAIN VIEW, Calif. – A terminal with a hard-copy impact printer, teleprocessing speed up to 240 char/sec, and two tape decks is available from Novar Corp.

Designated the Novar 5-51 Multiple Tape Printer Terminal, the equipment allows input and print formats to be stored on one tape cartridge, and information to be prepared for later transmission to a computer for storage on the second cartridge. Up to 48,000 characters of information can be stored on each cartridge.

"After 10 minutes of training, we have had girls operating the 5-51," William C. Bennett, company president said.

With the unit, an operator can prepare type information and store a copy on magnetic tape as it is being prepared. This draft is played back from the magnetic tape and printed out for verification.

During the playback the operator can key in additions, deletions, and corrections.

Portions of the original recording not needing alteration are transcribed onto a second tape for transmission to a computer or for playback.

Up to six copies can be produced with the 5-51. A tape duplication capability of the terminal allows one tape to be copied on one or more additional readers at speeds up to 240 char/sec.

In a three-minute transmission period, the terminal can transmit 43,200 characters, the company said.

Features of the terminal include unattended operation and automatic error correction. The terminal has a built-in modem, with communications speeds from 15 to 240 char/sec.

The Novar 5-51 Multiple Tape Printer Terminal is priced at $7,390, on a 60-day delivery Lease price is $205/mo.

Novar Corp. is at 2370 Charleston Rd. The 5-51 will be shown at the SJCC.

DEC Adds Disk Drive, Software Monitor

MAYNARD, Mass. – A new cartridge disk drive, along with operating software, reportedly can provide PDP-8 and PDP-12 users with up to 3,325,952 12-bit words of storage.

Concurrently with this announcement, Digital Equipment Corp. (DEC) also revealed five new interfaces designed to improve the data handling capability of the PDP-8 line.

In the disk pack mass storage system, the RK08, each removable file provides 831,488 words of storage, according to DEC. Up to four files can be handled by the system controller.

The disk is a single aluminum platter coated on both sides with magnetic oxide and is permanently mounted inside a protective cartridge that opens automatically when inserted in the driving unit.

Average access time to locate data in the system is 154 msec. In an additional 80 msec, 4K words of core memory can be transferred to or from the disk.

Price of the disk drive and first control unit is $16,500. Each additional drive unit costs $8,500. Deliveries will be made this spring, DEC said.

Software Monitor

The software monitor accompanying the system requires 8K words of core memory and either a high-speed paper tape reader or magnetic tape storage for building the sytem and loading programs, according to the company. The monitor can also be used with the other mass storage devices, such as fixed-head disk and magnetic tape units.

The monitor reportedly allows independent access of up to 15 I/O devices for a user. User programs may call on various monitor services, including file manipulation and program chaining. The user has access to standard DEC programs, including an editor, a PAL-D compatible assembler, Fortran, SABR asembler and linking loader, and a conversion program to put existing mass storage programs in the new format, according to the company.

The devices for the PDP-8s include an advanced analog input subsystem, a high-speed data channel multiplexer, an asynchronous serial line controller and line interface, and a timing device.

The AD01A analog input subsystem features a 10-bit analog-to-digital converter, and can handle up to 32 analog input channels with a maximum throughput of 70,000 conversions a second, according to DEC.

Techniques incoporated into the subsystem include ground isolation between the I/O bus and the analog circuitry and an interrupt enable control. The interrupt/non-interrupt mode is determined by a single bit in the word, which directs channel and gain selection. The AD01A is priced from $2,600 and will be available in June.

The data channel multiplexer, the DM04, working through the PDP-8/I or PDP-8/L data break facilities, can service simultaneous data breaks by using a priority system, from up to nine high-speed peripherals, according to DEC. Maximum transfer rate is 667,000 12-bit word/sec (625,000 in the PDP-8/L). The unit costs $1,500 and is available now.

Serial Line Control

With the DC02 asynchronous serial line control, PDP-8/L users can select under program control up to four type DC02C asynchronous parallel/serial, serial/parallel data stations. DC02A and DC02D logic modules are plugged into the processor through a prewired peripheral expander. The DC02A control is priced at $400; each DC02D data station is priced at $500. Both are available now.

For use in conjunction with the DC02A control, a clock and stop bit option which substitutes a variable clock for a standard clock is available. The unit reportedly permits the handling of lines from 25,000 to 125,000 baud, and is priced at $50.

A modem interface adapter, the BC01A-25, provides interface capability between the DC02D and modems meeting requirements of EIA specification RS 232. Only Send/Receive data is supplied, according to DEC. The adapter costs $80.

IBM Compatible COM Unit Outputs 26,000 Line/Min

SUNNYVALE, Calif. – A 26,000 line/min computer output microfilmer (COM) will be available in the third quarter of 1970 from Peripheral Technology Inc.

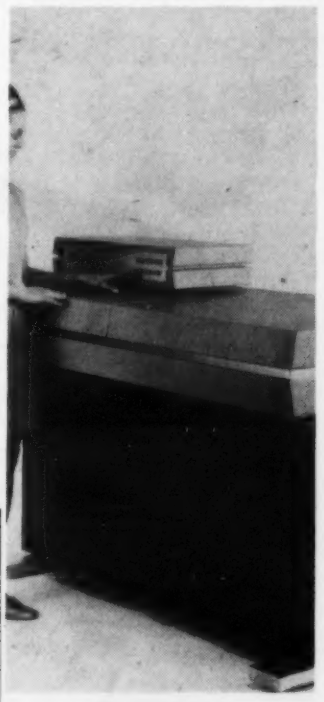
The PTI 2600 COM can operate on-line with IBM S/360s or off-line with 1,600 bit/in. tape transports. The device prints alphanumeric data onto 16mm film in either cine of comic mode.

The device accepts input directly from an IBM 360 or IBM-compatible 9-track magnetic tape. Records are of fixed and variable length, blocked or unblocked.

Output is 16mm microfilm in standard line printer format – 132 char/line, 64 line/page.

Throughput is 240 to 600 page/min. A basic set of 64 gothic-style characters (including upper case), expandable to 90 (to include lower case), is available. Bold face or normal are standard features.

Standard features include auto-



PTI 2600 COM

matic vertical and longitudinal parity checking and automatic reread on parity error detection. A built-in test generator is also included.

Other standard features are IBM-compatible Ebcdic input code, void frame mark, vertical tabbing, variable film pulldown, operator selectable 86 line/page, frame counter (operater reset), and 600-ft rolls of nonperforated microfilm.

Options include a card reader to handle varying input formats, print list mode, and optical reduction (42 times).

The PTI 2600 COM will be priced in the $60,000 range, said a company spokesman. Rental terms will be available.

Peripheral Technology Inc. is at 757 N. Pastoria Ave.

Display Terminal Uses Minimal Coding

PRINCETON, N.J. – A source data collection terminal with alphanumeric display is scheduled for fall delivery by Madatron Corp.

The device reportedly allows for entry of data at the source by employees unskilled in operating terminal or DP equipment. Data is collected in real-time and entered in input language, with extensive coding formats not being required, the company stated.

The unit works as an off-line peripheral to a computer system, but a number of units can work together on-line with a computer system.

The source data collection device consists of a command register (or annunciator) and an entry register. The command register displays ten alphanumeric display positions which indicate the format and type of information to be included (such as date, address, and description).

These commands are supplied electronically and sequentially as programmed on a program module, or read-only memory drum, an integral part of the device. Individual program modules can be provided for various entry programs and formats. To change the entry program, the operator selects the appropriate program module and plugs it into the device, the company said.

Madatron Display

In response to the command display, the operator keys in data to be entered and views this data on the 20-position alphanumeric display entry register. The operator then verifies the data displayed on the entry register prior to transferring the data onto an output recording medium, such as magnetic tape, punch cards, and punched tape.

Function keys for deleting records, repeating commands, and correcting and entering data are included in the device. The data collected can then be transmitted via dial-up telephone or private lines to a central processing system or data bank.

The Source Data Collection Device costs under $2,500. The unit may also be leased.

The address of Madatron Corp. is P.O. Box 172.

CRT Terminal Utilizes LSI/MOS Shift Register Memory

Applied Digital Data CRT Terminal

By Frank Piasta
CW Staff Writer

HAUPPAUGE, N.Y. – A low-cost Teletype-compatible CRT terminal, using an LSI/MOS shift register memory has been produced by Applied Digital Data Systems (Adds).

Provided with an acoustic coupler, the Adds Consul series of terminals can display up to 1,600 characters and has editing and formatting capabilities.

In contrast with most CRT devices available, the Adds unit displays black characters on a white background. This is claimed by Adds to ease eyestrain and to enable the operator to anticipate more easily the end of a line or the last character in a sequence of text.

The built-in acoustic coupler is said by Adds to tolerate (10-times) weaker telephone lines than other couplers.

The use of LSI/MOS (large-scale integrated metallic oxide semi-conductor) shift register memories and MSI (medium scale integrated) bipolar logic for use in editing and control circuitry are credited by Adds for the compactness and lower cost of the Consul series.

The terminal is equipped with an EIA RS 232B interface for connection to a custom-supplied modem. Adds will supply a built-in modem as an option and thus can provide either acoustic coupling or hardwired connection to a Bell Data Access Arrangement (DAA).

Parallel Interface

Data can be transmitted in half-duplex at 110 bit/sec or 300 bit/sec (switch selectable). The Consul can also be provided with a parallel interface for direct connection to a computer.

The three models of the Consul series employ a 9-in. TV monitor as a display device. The Consul 800 displays 16 lines of 32 char/line; the 840 displays 16 lines of 64 char/line and the 880, intended for use with time-sharing systems, displays 20 lines of 80 char/line.

The terminals operate in any of three modes – conversational, page, and message. In the conversational mode for question and answer situations, the operator types in characters that appear on the screen as they are being transmitted. A scrolling feature moves the lines continuously upward from the bottom of the screen like printed copy from a Teletype machine.

In the conversational mode the operator can edit without retyping the entire line. When the operator starts to edit or correct an error, the terminal automatically goes into an edit sub-mode. Once editing is completed, the terminal retransmits the entire line and automatically switches back to the conversational mode.

In the page mode, the stroke of the transmit key sends an entire page of data to the computer. In the message mode, the operator can transmit a partial page of data by positioning the cursor at the beginning of the message; the terminal will transmit only that which follows.

Editing is accomplished by using the cursor, horizontal tab, and screen erase controls. A "look ahead" feature that operates in page and message modes gives the Adds terminals the ability to scan ahead to eliminate the unnecessary transmission of blanks.

Models 840 and 880 have a special formatting feature that makes data entry easier and faster by fixed and variable data. The fixed data appears on the screen as grey characters (half intensity); variable data appears as black. The tabbing feature allows the operator to skip from one variable field to the next. Only variable data is transmitted.

Prices for the Adds terminals are: $2,995 for the Consul 800; $3,495 for the Consul 840; and $3,995 for the Consul 880. Initial customer deliveries are scheduled for August 1970, on a 90- to 120-day delivery schedule.

Applied Digital Data Systems is at 89 Marcus Blvd.

Wang 720 Narrows Computer and Calculator Gap

TEWKSBURY, Mass. – An improved version of the Wang 720 Programmable Calculator offers the user a device with many of the attributes of a computer while having the convenience and ease of operation of a desk calculator.

The device with 2K bytes of 2-μsec memory, a repertoire of 54 commands, the ability to use five-level subroutines, and the ability to accommodate numbers from 10^{+98} to 10^{-99}, could be either a calculator or a computer, according to Wang.

The resemblance to computers is strong due to the ability of the 720 to execute a program with as many as 1,984 steps, and to store and retrieve the programs from magnetic tape.

However, Wang refers to the device as the most powerful calculator available because it has the function keys and instantaneous readout that are characteristic of calculators and lacking in most computers.

When used as a calculator, operations that can be executed at a single keystroke include: arithmetic, logarithmic, exponential, trigonometric.

The trigonometric functions are retrieved from a magnetic tape cassette with the use of special function keys.

Operation Speeds

Speeds attained by the 720 approach those of computers currently available. Addition/subtraction, for example, takes 300 to 500 μsec and multiplication/division time varies from 2 to 5 msec.

The 720 is designed to accommodate numbers from 10^{+98} to 10^{-99}. Within the first 10 digits, the user enters the decimal point as if it were being written. For numbers beyond this range, the mantissa is keyed in, followed by a two-digit exponent.

All numbers are displayed on one-half in. high Nixie-type display tubes. Each of two registers (X and Y) displays 12 digits, the exponent of the numbers, and the correct algebraic sign.

The 720 contains 16,384 bits of core memory. This is organized as 248 data storage registers or 1,984 programming steps. For example, if a program contains 800 program steps, 148 data storage registers would be available.

The user may store and recall numbers and perform addition, subtraction, multiplication, and division in any one of the internal storage registers by either direct or indirect addressing.

Individual Program Steps

In order to program the unit the user sets the machine into the "learn" mode. He then keys in each step of the program. This enters the program into core storage. Individual program steps may be changed.

Once a program is "learned" in the core memory, it can be recorded onto a magnetic tape cassette. Each tape can hold 20 blocks of 960 steps each and each track of the tape can be protected individually from erasing, the company said.

A program can be transferred between core memory and the magnetic tape cartridge with seconds, Wang said. Automatically, the machine can sequentially load and execute up to 10 or more programs with a maximum of 960 steps each.

Wang 720 Series Programmable Calculator

The 720A has been priced at $6700. The 720B which incorporates all of the features of the 720A, plus the ability to use the 702 plotting output writer, is priced at $6800.

The 702 is equipped with a pin-feed platen with vertical spacing of one-half inch between pins. Horizontal spacing between pins is 13-1/8 in.

The price of the 702 has been set at $3,500. Wang is at 836 North St.

First deliveries of the 720A and 720B calculators and the 702 plotter have been scheduled for September.

TEC Remote Batch Terminal Gives Users Improved CPU Usage

EDEN PRAIRIE, Minn. – A remote job entry terminal is being offered by TEC, Inc. to users having remote access multiprogramming software in order to improve CPU usage.

Designated the TEC 520-40 RJE Terminal, the terminal reads an 80-column card deck, submits it to a CPU for compilation/execution, and prints the output on a standard 132-column line printer in desired format. The operator need only load

TEC 520-40 RJE Terminal

the cards and push the Go button, the company said.

Interface is standard RS 232B at speeds ranging from 110 to 9,600 baud synchronous or asynchronous. Standard code is Ascii. Other codes include Ebcdic and Transcode.

The basic configuration of the 520-40 includes a Mohawk 400 card/min reader, a Control Data Corp. 300 line/min printer with 132 columns, an operator control panel, a synchronous or asynchronous serial communication interface and the programmed controller with cables and installation.

Price is $29,400. The terminal without the card reader and printer is priced at $17,190.

The controller software, included in the price, provides the ability to "individualize" the terminal to either the operating system or the terminal operator. A program is available to simulate the 2780 terminal. The company said that other programs are in development.

The terminal can be expanded with a card punch, CRT display(s), and keyboard(s).

Delivery is 90 days.

TEC, Inc. is at 6700 S. Washington Ave.

TransCom Terminal Eliminates Need for Audio Response Unit

BLOOMFIELD, Conn. – A terminal available from TransCom Inc. offers hard-copy digital printout, a send/receive capability, and built-in audio capability which eliminates need for an audio response unit.

The IT-216-S terminal reportedly provides instant digital visual verification of entry data. Used on-line, the terminal can be a direct substitute for existing Touch-Tone pad input devices, while having four additional characters, the company said. Used off-line, the unit will transmit to one of a variety of company receiving interface units, and produce machine readable punched card or tape input.

The company said that the operation of the IT-216-S can be learned in minutes. A user dials a keypunch phone number over regular phone lines, and the answer received is either manual or automatic. The user then switches to transmission mode, and the message may be keyed in.

The terminal and interfaces are compatible with phone company Touch-Tone equipment. Input is from a manually operated keyboard, and output is in standard Touch-Tone frequencies, TransCom said.

Transcom Terminal

Optional features include 30 char/sec printer; 12, 13, or 16-button keyboard; hardwired or acoustically coupled; and Send only, Receive only or Send and Receive.

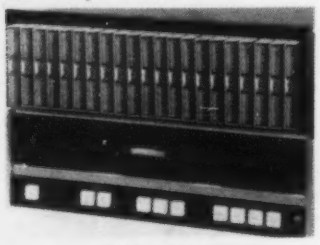
The IT-216-S (send only) terminal sells for under $750 and leases at $18.75/mo on a 60-month lease. With acoustical coupling and send-and-receive capabilities, the lease price is $27.40/mo. Most company interface products lease for approximately the same price, the firm said.

TransCom Inc. is at 12 Tobey Rd.

Triple-Drive Cassette Unit Used With DEC, H-P Minis

MOUNTAIN VIEW, Calif. – A magnetic tape operating system designed to increase the capability of minicomputers is available from Xebec Systems, Inc.

Called the Xebec ICU, the system uses a compact triple-drive tape cassette unit as its basis for on-line operation. One cassette carries the standard software system; the second handles the user's source information; and the third carries the object program.



Xebec ICU

The magnetic tape system is available now for use with Hewlett-Packard 2114s, 2115s, and 2116s; and Digital Equipment Corp. PDP-8s and -12s. A company spokesman stated that Xebec is also working on system compatibility with Data General and Varian equipment.

The Xebec ICU has input and output speeds each of 500 char/sec, and start and stop times of under 15 and 10 msec, respectively. The end-of-tape to beginning-of-tape rewind time is under 60 seconds, and forward tape speed is 10 in./sec, according to the company.

The system features use of a single systems tape and individual source and output tapes. Storage capacity is 180,000 characters per cassette.

The price of the Xebec ICU ranges from $6,200 to $6,550, which includes a 90-day maintenance warranty. Delivery is 60 days.

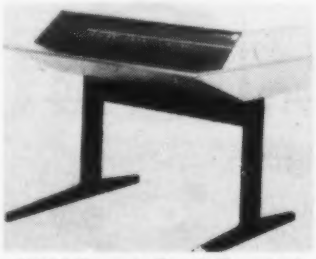
Xebec Systems, Inc. is at 918 N. Rengstorff.

Terminal Allows User Peripheral Choice

ORANGE, Calif. – A remote batch terminal available from M&M Computer Industries, Inc. allows the user independent selection of interfacing peripherals.

The Remote Batch Terminal includes auto-answering for dial-up lines, automatic turnaround, multiple record transmission, horizontal format control, Ebcdic transparency, and multi-point line control as standard features.

Other features include: 2,000-bit/sec dial-up and 2,400-, 4,800-, and 9,600-bit/sec leased line; half- or full-duplex operation (two- or four-wire); basic 4K by 16 memory expandable in 4K increments; Ebcdic, Ascii and transcode operator selectable, and terminal to terminal communication.



M&M Remote Batch Terminal

Also included is interfacing for a variety of peripherals including printers made by Data Products, Mohawk Data, and Potter Instrument Co.; a CalComp plotter; and an Ampex tape unit.

According to the firm, the terminal will interface with IBM 360/40 and up, Univac 1108, RCA Spectra Series, Control Data 3000 and 6000 Series, XDS Sigma Series, GE 400 and 600 Series, and the Digital Equipment Corp. PDP-10.

The unit handles line printers at 315, 600, and 1,200 line/min with 32-, 64-, and 128-character sets, card readers with 51 or 80 columns at 200 to 1,000 card/min, paper tape readers five-through eight-level at 100 to 1,000 char/sec, up to 20 teletypewriters, 12 CRT devices, and interfaces with magnetic tape transports and incremental plotters. New peripherals can be added in the field with no system downtime, the company claims.

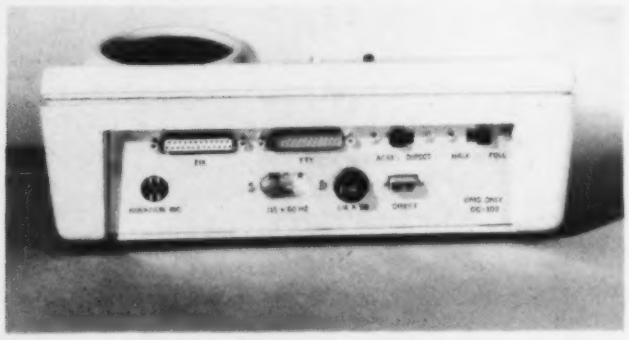
The peripherals may be purchased from M&M or from the suppliers.

The basic price of the terminal is $20,900; it includes an enclosure, one controller for one printer (of a possible five), for a card reader, and an operating system program. The terminal is available on a 30-day delivery.

M&M Computer Industries, Inc. is at 770 N. Main St.

Couplers 'Sensitivity' Rivals Bell 103A

TARZANA, Calif. – A series of acoustic data couplers are claimed by the maker, Novation, Inc., to have the sensitivity and noise immunity of a direct-connected data set such as the Bell103A.



Novation DC-102

The DC-102 series can accommodate EIA compatible terminals or Teletype printers by using side-by-side rear connectors. This permits simultaneous operation of a Teletype printer and EIA compatible devices such as a plotter and CRT display, the firm said.

The series has two models: the DC-102A and the DC-102AD.

Features of the couplers include: acoustic and direct capability by means of rear panel switch (DC-102AD only); half- or full-duplex operation by means of rear panel switch; high impact injected plastic case and dynamic receiver sensitivity of -50 dbm in the acoustic mode, and -57 dbm (DC-102AD only) in the direct mode.

Other features include floating acoustic muffs which isolate the microphone from vibration and shock; a missed carrier detector which causes the coupler to remain off in the presence of high noise and delays the transmitter turn-on for 3.5 seconds to allow for a manual handshake sequence; and a carrier detection system which provides a visual indication when the signal being received is capable of producing valid data.

The indicator lamp will not light, the company said, until four criteria have been established: signal level is sufficiently high; signal to noise level is sufficiently high; signal is within data frequency band; and signal is steady enough to be processed properly.

The DC-102A costs $315, and the DC-102AD $350. Delivery is off-the-shelf.

Novation, Inc. is at 18664 Topham St.

Custom Configured Data Terminal Lets User Design Requirements

MAYNARD, Mass. – A data terminal that is custom configured to user requirements for data capture and retrieval is available from Data Terminal Systems, Inc.

The user can design his terminal to use familiar notations in the sequence of data entry, according to the company. Only options necessary to perform the job need be purchased.

These options include: variation in number of keys, size, color, grouping and key top designation; 6-, 20-, and 80-column printers; displays (message units and numeric); credit card/badge readers; tape cassette; and cash drawer devices.

The terminal may include stand-alone logic and processing capability or can be linked up to any minicomputer with up to 32 other terminals, the company said. Software may be selected to the level required.

Prices for the terminal start at $1,500. First deliveries are set for June, on a schedule basis of about two months.

Data Terminal Systems, Inc. is at 239 Main St.

Link-Berc 4660 Evaluates Data Link Performance

DANBURY, Conn. – A unit to evaluate the performance of digital data links has been developed by Data-Control Systems, Inc.

Designated the Model 4660 Link-Berc, the device can measure and display the bit error rate caused by digital transmission and detection or storage devices. The Link-Berc can also measure and display clock advances and retard (bit slippages) within modems and bit synchronizers.

The unit operates from DC to 10 Mbit/sec in Irig codes and generates a pseudo-random bit-stream which is input to the unit under test. The output of the test unit is fed back into the 4660 where the stream is recognized.

Requiring only the transmitted pattern for evaluation, the Link-Berc eliminates duplex lines and complex delay circuitry, the company stated. Evaluation of infinite delay links such as magnetic tape recorders, drums and disks as well as variable delay links (RF and hardline), modems, bit synchronizers and conditioners is allowed.

The Link-Berc consists of a transmitter section and receiver section. Pulse code modulated wave trains are transmitted through the link, or device under test, and are received into either the same Link-Berc in a closed loop, or a companion unit at some remote location, the company said.

In the receiver section, the input bit-stream is decoded, compared, and the bit error rate displayed. Bit slippage, both advances and retards, may be measured and displayed. According to Data Control the loop stability characteristics of a bit synchronizer or reclocking ability of an industrial modem, may also be evaluated by blanking data.

The Model 4660 Link-Berc costs $3,700. Delivery is 90 days.

Data-Control Systems, Inc. is at Commerce Park.

we're sorry, Mr. Watson

For yielding to temptation in a recent advertisement. And comparing your 2265 so unfavorably to our ATC 2265. (*Your* price, you'll recall, was $6,375 more than *ours.)* Never again! Since the ATC 2265 Data Display Terminal does sell on its own merits, here goes.

To begin with, the ATC 2265 puts up 960 clear, legible cursive stroke characters (and our Model 2266 puts up 1920!).

Undeniably, the ATC 2265 *is* completely compatible with IBM System/360. And plug-to-plug interchangeable with the IBM-2845/2265 stand-alone terminal. Right down to the software. Delivery on the ATC 2265 is 90 days. Maintenance is available from our network of close to 1,000 C.E.'s.

Here are some more merits. Program Controls for character addressing, formatting ability, protect mode and auto tab erase. Plus two Operator's Controls: insert key and delete key. Plus optional lower case, limited graphics and hard copy.

ATC also makes multi-station display terminals, in 1920, 960, 480 and 240 characters. All offering unbeatable cost/performance ratios, buy or lease.

Will you forgive us now, Mr. W.?

The ATC 2265 is sold and serviced through more than 45 MAI offices in the United States.

MAI

300 East 44th Street, New York, N.Y. 10017

Manufactured by

Atlantic Technology Corporation

The Display Company

COMPUTERWORLD

societies/user groups

Data Center Management Personnel Organize 'Coma' to Exchange Ideas

CHICAGO – A nonprofit organization, the Computer Operations Management Association (Coma), has been organized by several area firms to provide a forum for data center management personnel.

Coma Vice-President Ted Hoedl said: "We just felt that many of the people who work nearly around the clock were often being forgotten in this whole glamorous area." The members, primarily machine operations managers, meet monthly to exchange ideas and information.

Two other officers were named to one-year terms following November elections. They are Paul Kline, CNA/Insurance, president; and George Popp Jr., Harris Trust and Savings Bank, secretary-treasurer. Additional information about Coma is available from Hoedl at Standard Oil Co., 910 S. Michigan Ave., Chicago, Ill. 60680.

System 3 Users Form Information Group

PHILADELPHIA – Representatives of several companies with an active interest in the System 3 met here recently to form the Delaware Valley System 3 Users' Group.

At this first meeting, bylaws were adopted and temporary officers were selected. The organization was formed for the following purposes and objectives:

- To provide a forum for the discussion of topics of mutual interest to System 3 users.
- To serve as the focal point for information relating to System 3.
- To enable System 3 users to establish working relationships with other System 3 users.
- To become a representative group for the System 3 community.

The organization is interested in increasing its membership. Anyone interested can contact Tom Adamski, the Secretary-Treasurer, at Trilog Associates, Inc. 1700 Market Street, 15th Floor, Philadelphia, Pa. 19103. vania 19103 or should call (215) 564-3414.

Societies Shorts

AACC Director Named

YORKTOWN HEIGHTS, N.Y. – The American Automatic Control Council (AACC) has elected Charles M. Doolittle, director of planning and measurement for IBM's Advanced Systems Development Division, to a two-year term as president.

Other officers are Duane T. McRuer, president of Systems Technology, Inc., vice-president; Dr. Gerald Weiss, Polytechnic Institute of Brooklyn, secretary; and William E. Vanna, Foxboro Co., treasurer.

Formed in 1957, the council promotes cooperation among several U.S. technical societies concerned with instrumentation and automatic control.

DPMA Chapter

RALEIGH, N.C. – A charter has been presented to the 20th student chapter of the Data Processing Management Association (DPMA), at W.W. Holding Technical Institute.

The first such chapter at a technical institute, Epsilon Delta Pi has 37 members. The group's purposes include developing a better understanding of data processing and related equipment, studying technical methods with a view toward improvement, and improving student understanding of the expanding role of EDP.

Uaide Elects

WARREN, Mich. – James Splear of the General Motors Research Laboratories has been elected national president of Uaide (Users of Automatic Information Display Equipment).

Splear assumed office at the organization's recent annual meeting in San Diego, having served as a national board member and chairman of the computer equipment committee in 1969.

Uaide's membership is comprised of about 300 users of Datagraphix computer-oriented display equipment. The group's ninth annual meeting is scheduled for Miami Beach in October.

Computer-Related Art

NEW YORK – Dr. Monroe M. Newborn, chairman of the art and music subcommittee for the 25th national conference, Sept. 1-3, is seeking outstanding examples of computer-related artistic endeavor for presentation at the conference.

Plans call for showings of computer-generated or inspired art and music, computer-related films, and a display of computerized sculpture and weaving.

Prizes will be awarded to winners in various categories, and entries may be offered for sale by the artist. Newborn is with Columbia University's Department of Engineering, 1340 S.W. Mudd, 10027.

U.S. Congress Head Named

NEW YORK – Dr. Herbert Freeman of New York University has been named chairman of the U.S. Committee for Congress '71, the August, 1971, conference of the International Federation for Information Processing (Ifip) to be held in Ljubljana, Yugoslavia.

Freeman is professor and chairman of the department of electrical engineering at NYU and a lecturer in systems analysis, optimum control, and digital computer systems. He served as vice-chairman of the U.S. Committee of the Ifip Congress '68 in Edinburgh, Scotland, and has held a variety of IEEE posts, including his current chairmanship of the New York Chapter of the IEEE computer group.

Ifip was formed in 1960 as a multinational organization of professional and technical societies concerned with information processing. Its purpose is to advance the interests of member societies through international cooperation in the field, including sponsorship of conferences, symposia, and triennial world congresses.

Calendar

May 4-5, Atlantic City, N.J. – Digital Equipment Computer Users Society (Decus) 1970 Spring Symposium. Contact: Mrs. Angela J. Cossette, Decus Executive Secretary, Digital Equipment Corp., Maynard, Mass. 01754.

May 4-8, New York – A course on "Managing the Modern Data Processing Department," and on May 18-22 a course entitled "Computer-based Systems: Fundamentals of Planning and Design." Contact: AMA, American Management Association Building, 135 West 50th St., New York, N.Y. 10020.

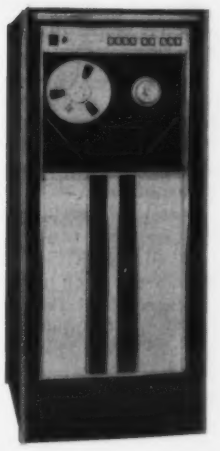
May 5 and 12, New York – A lecture entitled "A Close Look at Macro Processors," and on May 19, 26, and June 2 a lecture entitled "An Introduction to Simulation." Contact: Carl Hull, Bristol-Myers Co., 345 Park Ave., New York, N.Y. 10022.

May 9, Lancaster, Pa. – A seminar-workshop on computer applications in the social sciences presented by the Middle Atlantic Educational and Research Center (Merc). Contact: Bruce G. Holran, Director of Public Relations, Franklin and Marshall College, Lancaster, Pa. 17604.

DIGITAL SYSTEMS from TI

Plug-to-plug compatible tape units for System/360

Series 924 combines economy with improved reliability and MTBF for effective replacement of original equipment. Improved tape path and single capstan drive provide oxide contact only at the head, insuring increased tape life, better data integrity.



Advanced tape units for original equipment manufacturers

Series 959 combines design simplicity, reliability and MTBF characteristics of the Series 924 with a fully deskewed digital interface desired by the O.E.M. Basic design offers cost effective operation, with electronic controls that replace mechanical parts, reduce maintenance needs.

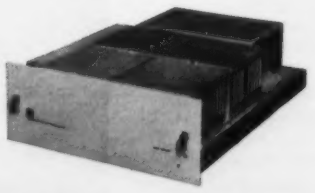
Data terminals for telecommunications, computer input/output

Electronic Data Terminals from TI are fast (up to 400 wpm, 40 cps), quiet (non-impact electronic printing), attractive replacements for noisy mechanical types. Compatible with Teletype and IBM 1050 or 2741 terminals.

A message switching computer system for small and medium-scale communications systems

The **980/EMS** is an economical, fast, efficient stored-program system that handles from 4 to 128 circuits on private-wire and public-switched networks.

Magnetic core memory systems for computer mainframe and system design



Model 900 systems are modular, rackmounting chassis units that add from 4K to 65K memory capacity to computer systems. Feature solid-state circuitry, interchangeable plug-in PC cards.

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Pentagon Sharply Restricting Computer Expenditures

By Edward J. Bride
CW Staff Writer

WASHINGTON, D.C. – The Pentagon has reacted to criticism of cost overruns with sharp restrictions on computer expenditures.

A memorandum issued by Deputy Defense Secretary David Packard halts all "development, implementation, or expansion of automated data systems" costing more than $250,000.

The note cites the personal concern of Packard, plus Congressional criticism of "expensive and complex systems" formerly justified as experimental.

Packard said these systems are no longer experimental in nature, and "are invariably encountering delays and costs which are greater than initially anticipated."

Last year, Vice Admiral Hyman G. Rickover, the Navy's top nuclear submarine expert and long-time critic of defense procurement procedures, spoke out against computer companies which were exempt from renegotiation of contracts.

The government's Renegotiation Board, charged with recovering excess profits, was operating an understaffed office with "miniscule" funds, the three-star admiral said. He added that government procurement is "pretty much out of control."

Last year, the Air Force held some prominence in the cost overrun picture when that service eliminated the job of a cost analyst who predicted the criticized overruns on the massive C5A contract with Lockheed [CW, Dec. 10, 1969].

Ernest Fitzgerald was dismissed because of funding restrictions, the Air Force said, adding that a "computer error" had mistakenly given him job tenure.

Fitzgerald testified before the Joint Economic Committee in November, and was released 12 days later. He, too, was critical of defense procurement procedures.

Rickover's testimony was critical of many contractors, but he singled out computer manufacturers as a privileged group which was exempt from renegotiation.

The admiral also charged that some large computer companies "refuse to comply with the Truth-in-Negotiations Act in selling to the government."

Rickover appeared before a subcommittee of the House Committee on Government Operations last fall. His testimony was released this month.

The admiral said that the computer industry had taken the position that "cost and pricing data will not be provided to the government for new design computers. Consequently, the government has to waive the Truth-in-Negotiations Act . . . even though government computer procurement amounts to over $3 billion each year."

"No one knows how much profit computer firms make on government contracts," the Admiral said.

Rickover continued that, if defense computers were of the commercial variety, then the exemption from Truth-in-Negotiation or the Renegotiation Act "might not be too bad." "But today," the Admiral charged, "many of our computers . . . are developed specifically for military applications. Where much of the applicable research and development work is paid for by the government, that exemption is not appropriate."

The Packard memorandum, issued in February, places a moratorium on "further development, implementation or expansion . . . until the services and agencies have critically reviewed these systems."

The note repeatedly prohibits all defense agencies from taking any action "toward the further acquisition of computers, including issuing a request for proposal, entering into a contract, or otherwise issuing an order for computers, or committing substantial resources toward further development or revision of automated data systems."

Exempted from the moratorium are computers which are "integral to a weapon system," those used by defense agencies for research and development of ADP technology, and those costing less than $250,000.

Weapons computers have traditionally been treated separately for most reports and budgetary submissions. Informed sources said that "fire control" computers for conventional weapons, and guidance systems for missiles would be included in this category.

The memorandum asks the assistant secretary of defense (comptroller) to develop both long- and short-range plans and objectives, "in full cooperation with the services and agencies."

Packard noted that development, expansion, and implementation of a computer system could go forward "only when we are sure that planning, economic analysis, and system monitoring procedures are comprehensive and well-documented."

He said that the review requirement would remain in effect until replaced by "permanent control procedures."

All procurements must have "departmental or agency level approval" after the review, the memo stated.

Computer Firm to Aid Ghetto Enterprises

NEW YORK – A joint venture plans to develop profitable businesses in ghetto areas in New York.

Thomas T. Fleming, president of Scientific Resources, Inc., a Philadelphia-based computer technology firm, announced that his company would supply most of the money and some of the brainpower to businesses in the area in which black management would hold a majority interest.

The new venture will be called Plan Resources, Inc., and will be headed by Donald Simmons. Scientific Resources will hold a 45% interest in the new company.

Plan Resources will be the vehicle to launch the partnership and has the responsibility of recruiting the manpower and establishing the groundwork within the ghettos.

The project will be tailored toward encouraging minority groups into a profit-making business, a spokesman for Plan Resources said.

The spokesman said that the new enterprise will focus on four areas: urban planning, minority enterprises that will utilize the small business investment corporation approach, data processing, and development of financial concepts.

'Project Search' Combines Ten States to Prevent Crime

WASHINGTON, D.C. – Ten states will cooperate on a criminal search system which closely parallels the FBI's National Crime Information Center (NCIC) They will, however, store and retrieve data on local and state offenders, while the NCIC performs similar services for Federal offenses.

The system will be developed under a grant of $832,200 from the Law Enforcement Assistance Administration (Leaa), and will be entitle Project Search (System for Electronic Analysis and Retrieval of Criminal Histories).

Attorney General John N. Mitchell announced the grant, which will be shared by Arizona, California, Connecticut, Florida, Michigan, Minnesota, New York, Texas, and Washington.

The funds for each state will be decided by the Search group on the basis of individual budget submissions.

Charles H Rogovin, Leaa Administrator, said that four states have just become active members of Search – Connecticut, Flordia, Texas, and Washington. They previously participated only as observers.

Project Search began under Leaa sponsorship last July, with the other six states participating under a $600,000 grant.

Offender Data

According to Rogovin, Search states have developed an information system that will contain offender records such as arrest data, results of trials, whether probation was granted, prison sentences, time served in prison, release data, and subsequent arrests or parole violations.

He said the system will have an index of state-maintained offender record histories. Conversion to computer format has already begun, he said.

Rogovin also said that the General Services Administration is helping to develop the national telecommunications network which is an integral part of the project. Through this network, a law enforcement agency could easily determine the availability of information on a specific offender.

Upon request, the agency would receive a quick summary of the offender's entire record.

This detailed record-keeping, Rogovin noted, would also enable a state to compile statistics on arrest rates, court sentencing patterns, length of sentences, re-arrests, and other matters of concern to criminal justice.

On-Line This Summer

The project is reportedly on schedule, and Search is expected to be demonstrated in July and August.

Rogovin said the project states will submit their data to the national index in the Search prototype Police Computer Center at Michigan State University.

Total cost thus far is reported at $2.4 million. Cost this year will be $1.4 million, including $554,000 in matching funds contributed by the 10 Search states.

The remaining $1 million was spent last year, with $400,000 coming from the original six Search states.

Post Office Evaluates 'Prompt' for Faster Zip

SAN DIEGO, Calif. – Preliminary testing of an advanced electronic system designed to gather information about the handling and movement of U.S. mail was completed recently by the Bureau of Planning and Marketing of the U.S. Post Office in cooperation with General Dynamics.

Called Prompt (Program to Record Official Mail Point-to-Point Times), the investigative program is one of a number of actions being undertaken by the Post Office Department to develop a comprehensive information system using modern instrumentation for timely data collection.

The system involved a series of "electronic letters" each containing a printed circuit card, which were mailed in various mail types such as letters and boxes, and addressed to known destinations, according to Neil Halliday, chief of the Service Analysis Branch of the Bureau of Planning and Marketing.

In addition to the printed cards, the system was composed of a constant frequency transmitter, a multichannel radio receiver, and an antenna system.

This equipment, placed in strategic locations in the main processing facility established a record of mail flow, Halliday said.

Mail Flow

"When we set up a transmitter-receiver station, we inserted a uniquely identifiable printed circuit card, or tracer card, in the envelope or box with the prefixed address," he said.

"This was then dropped in the mail at a precise time. By virtue of the address we were able to force this letter to flow through certain processing areas. In the course of doing this, the card was brought into the vicinity of the transmitting equipment. This caused the cards to transmit information about the time elapsed at any given point," he said.

"This allowed us to find out how long it took for a piece of mail to move between any two points. We could then precisely establish what the throughput time was for a given activity," he said.

National Monitoring

"The capacity to track the mail to final destination allows us to localize problem areas not only within post offices but within the total post office system," Halliday explained.

"It gives us the potential of an integrated national monitoring system for determining the service performance level," he said.

"With the computers that are scattered throughout the whole postal system, the tests suggest a data bank approach in which one of the information modules would be dedicated to information of the the kind that has been collected in the experimental system. With that information, we could periodically update and report information out on an exception basis. Once we have developed a sufficient historical file, we would be in a position to set acceptable quality limits," he said.

The next step in the process, Halliday explained, involves the examination and evaluation of the experimental system to determine its potential application in other post offices throughout the U.S.

It's new.
It's fast.
It's Varian's 620/f.

Varian Data Machine's new "superfast" computer has a 750-nsec cycle time. That means it executes two and a half times faster than the well known 620/i.

And check these other outstanding features:

- 100% upward compatible from the 620/i.
- All 620/i software executes on the 620/f —you can take advantage of the extremely large library of software field-proven on the more than 1,200 620/i's in worldwide use.
- Fastest I/O in minicomputers.
- Powerful new addressing modes and instructions.
- Read-only memory.
- All 620/i peripherals plus a new low-cost line.

For full details, request the new handbook. The 620/f—another development that keeps us the big company in small computers.

U.S. Sales Offices: Downey, San Diego, San Francisco, Calif.; Washington, D.C.; Atlanta, Ga.; Chicago, Ill.; Waltham, Mass.; Ann Arbor, Mich.; Albuquerque, N. Mex.; New Rochelle, Syracuse, N.Y.; Fort Washington, Pa.; Dallas, Houston, Tex. Other offices worldwide.

Varian Data Machines, a Varian subsidiary,
2722 Michelson Dr., Irvine, Calif. 92664.
Telephone 714/833-2400.

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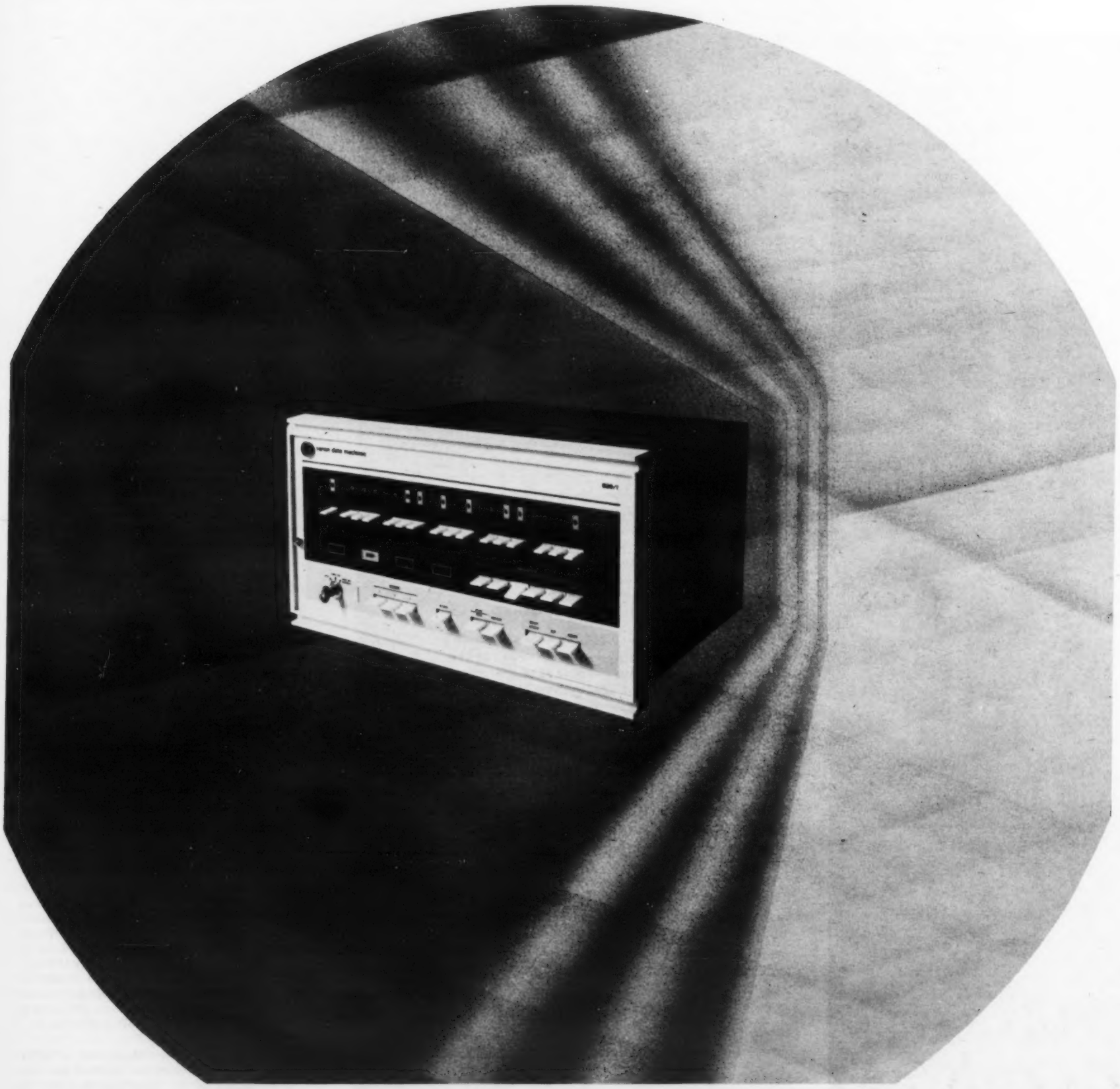
See the 620/f at the SJCC Booth 3004.



SJCC at Atlantic City to 'Swing' With 40,000 Expected

(Continued from Page 1)

City every 15 minutes with the hope that many people from the Washington-Boston corridor will drive to the conference.

Overloaded Phone Circuits

At the 1969 Fall Joint in Las Vegas the biggest problem was overloaded phone circuits, but this should not be repeated in Atlantic City, according to Charles Asmus of Afips.

To be exact, the Southern New Jersey Bell Co. took advantage of the Fall Joint by sending observers to Las Vegas to oversee the operation there. Spokesmen said they learned what not to do from the operation there.

Since the Southern New Jersey Bell Telephone Co. has handled a joint computer conference before, he said, the rapport between the telephone system and the joint conference organizations is "good." Southern N.J. Bell System is also better equipped to handle the large amount of data communications expected for the conference without overloading circuits than the Mountain State Bell Systems was for the Las Vegas conference, he said.

Another major worry – and a problem that plagued the 1969 Spring Joint – concerns the availability of hotel space for the conference, Afips said.

Afips has reserved 14,000 hotel rooms specifically for the conference, and officials at the Atlantic City Convention Bureau said they "expected no problem" handling up to 40,000 conventioneers, although they could not give the number of hotel rooms available in the city itself.

Walk-In Visitors

The crowds that jammed the exhibit floors in both Boston and Las Vegas will be held down somewhat by Afips' elimination of "walk-in" visitors, which Afips labels "marginal interest"-type attendance. Previously, "exhibits-only" visitors paid a $5 admission fee.

Now these visitors will either have to get guest passes from exhibitors or pay the full $40 registration fee charged to nonmembers of the Afips constituent societies. Members of Afips societies will pay a $20 fee for the conference, while students and military personnel will be charged $5 for registration.

According to Asmus, the new fee schedule should eliminate around 5,000 people who would have been expected to "walk in" for the exhibits only. In Boston a year ago, less than 10% of the exhibit visitors were "walk-ins," Afips said.

The more than 940 exhibit booths at the SJCC will be spread over two floors in the cavernous convention hall, with more than 400 booths in the lower floor of the hall. The remaining exhibits will be on the main floor, which accommodated all of the SJCC exhibits when the conference was last held in Atlantic City in 1968.

The Boston show a year ago attracted 145 exhibitors in 450 booths, but the fall joint in Las Vegas was approximately the same size as this year's spring joint with about 360 firms exhibiting in 990 booths.

This year's spring conference would have had a larger exhibit than at the Fall Joint, Afips sources said, if the organization had not limited the number of booths available. It may still top the fall joint in attendance.

The last time the joint computer conferences descended on Atlantic City they drew a crowd of 18,000 and had just over 100 exhibitors. This year's show promises to at least double that earlier effort.

What to Do

Some of the computer industry's "swinging" set have wondered "what do you do in Atlantic City in early May?"

Atlantic City is a full-fledged convention city during the winter, Afips said. All of the good restaurants in the area – and there are quite a few – stay open the year round. During early May most of the small shops along the boardwalk will be open, including a good number of taffy emporiums.

The major summer attraction – the steel pier – will be closed for the SJCC, however, and it is doubtful that the amusement park will be in full swing, even though the Atlantic City convention bureau said that some of the rides will be operating.

Among the exhibitors displaying more than $100 million worth of computer equipment will be 80 organizations displaying their wares for the first time at a joint conference, Afips said. The exhibits have been a sell-out for the past few months, according to Edward R. Snyder, exhibits chairman.

The exhibits portion of the program will be open from 10 a.m. to 6 p.m. on Tuesday; 10 a.m. to 9 p.m. on Wednesday; and from 10 a.m. to 5 p.m. on the last day of the show. All of the exhibits will be housed in the convention hall, even though around 400 booths will be on the lower floor of the building, which has relatively low ceilings for an exhibition hall.

Special activities, in addition to the technical sessions and exhibits scheduled for the show, include a special ladies program, which will have sessions on interior decorating and fashions, in addition to a luncheon.

Of special note in the special activities is a "pre-university technical program" sponsored by the Resistors. Held Tuesday evening between 6 and 8, the session will feature technical papers by pre-university students. The other special session – to be held Wednesday between 6 and 8 – will present a panel discussion on "venture capital" in relation to firms in the computer field.

Cocktail Party

There will also be a cocktail party on Tuesday from 6 to 8 in the Granada room of the Howard Johnson Motor Lodge.

The Conference banquet will be held Wednesday in the ballroom of the Shelburne Hotel at 7 p.m. A no-host cocktail party will precede the banquet, which will feature an address by G.F. Pieper Jr., director of space and applications science at Nasa's Goddard Space Flight Center.

The technical sessions for the conference will be kicked off by a keynote speech by Sam Wyly, chairman of the board of University Computing Co., at 10:30 in the convention center ballroom. He will speak on the topic of "Computing, Communicating and World Business" and attempt to show that the computer industry can be a greater international force than foreign aid.

The sessions will get underway at 1 p.m. The main ballroom of the convention center will hold 5,000, but the other two rooms in convention hall only hold 1,200 and the ballroom at the Holiday Inn will only accommodate 900.

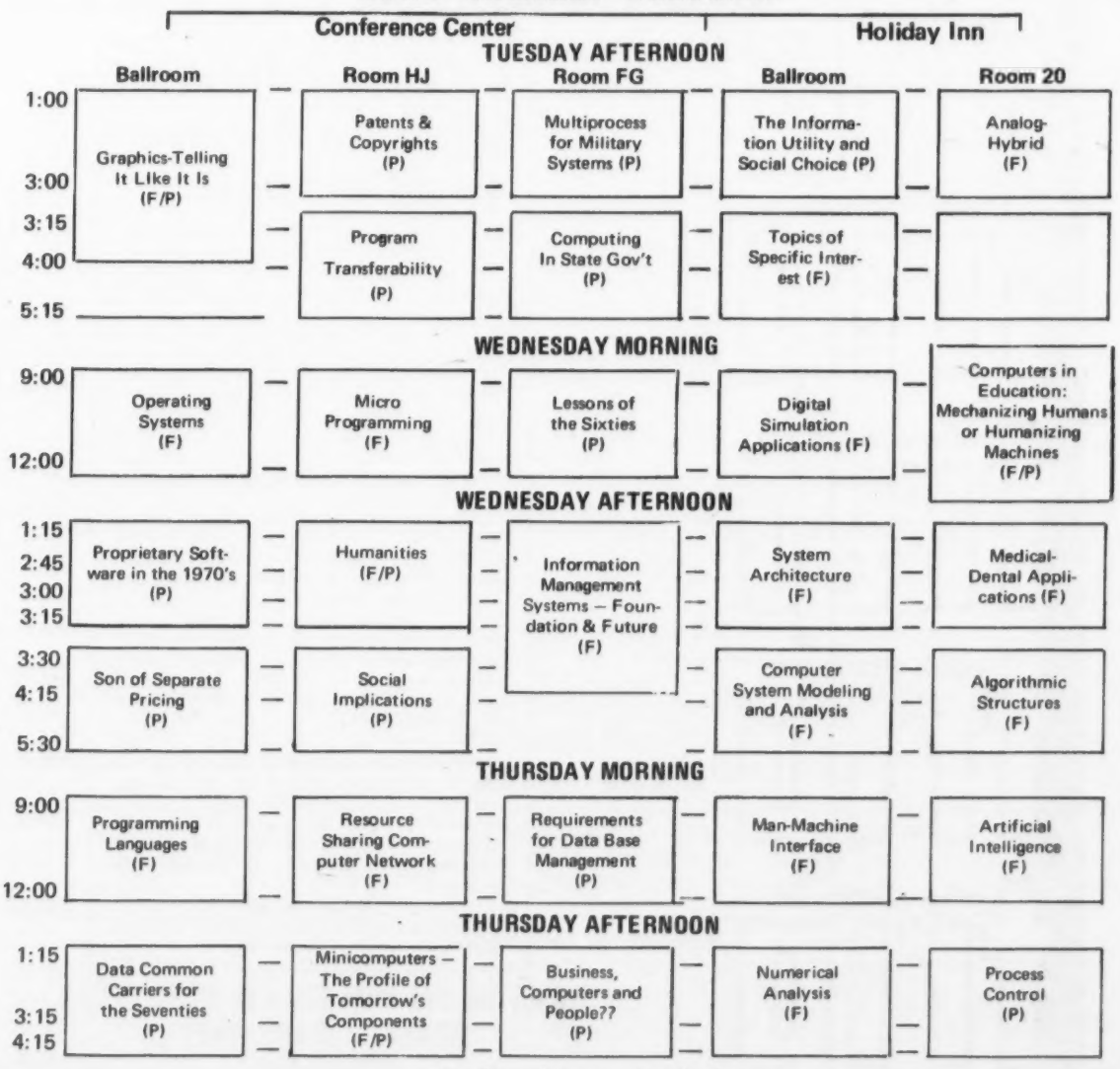
Afips again this year has made attempts to make the session speeches more interesting for the listener with briefings for the speakers and careful selection of session topics.

Sessions

Sessions picked by Afips for special interest include:

- "Graphics – Telling It Like It Is," under H.K. Johnson, consulting engineer, Tuesday, 1 p.m.
- "Patents and Copyrights," H.R. Popper, Bell Telephone Laboratories, Murray Hill, N.J. Tuesday, 1 p.m.
- "The Information Utility and Social Choice," H. Sackman, System Development Corp., Santa Monica, Calif. Tuesday, 1 p.m.
- "Computing in State Government," Alvin Kaltman, Commonwealth of Massachusetts, Boston. Tuesday, 3:15 p.m.
- "Microprogramming," J. Green, Scientific Resources Corp. Wednesday 9 a.m.
- "Lessons of the Sixties," S.B. Weinberg, Cybernetics International, New York, N.Y. Wednesday, 9 a.m.
- "Proprietary Software in the '70s," M.A. Goetz, Applied Data Research, Princeton, N.J. Wednesday, 1:15 p.m.
- "Social Implications," Dr. James Ramey, Queens College of the City of New York, N.Y. Wednesday, 3:30 p.m.
- "Son of Separate Pricing," Robert B. Forest, Datamation, Pasadena, Calif. Wednesday, 3:30 p.m.
- "Artificial Intelligence," chaired by Saul Amarel, Rutgers University, New Brunswick, N.J. Thursday, 9 a.m.
- "Resource Sharing Computer Networks," L.G. Roberts, Advanced Research Projects Agency, Washington, D.C. Thursday 9 a.m.
- "Data Common Carriers for the Seventies," S.L. Mathison, Arthur D. Little, Inc. Thursday, 1:15 p.m.
- "Minicomputers – The Profile of Tomorrow's Components," chaired by R.A. Kaenel, Bell Telephone Labs, Murray Hill, N.J. Thursday at 1:15 p.m.

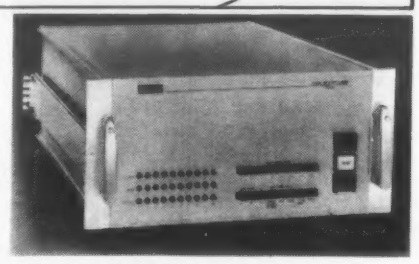
SJCC Seminar Schedule



F = Formal Paper P = Panel

Products on Show At Spring Joint

Codex Time Division Multiplexer, TM-8, To Tally Transparent



Codex's TM-8 time-division multiplexer

WATERTOWN, Mass. – Codex Corp. is showing its new time division multiplexer that can service simultaneously up to eight terminals of mixed data speeds from 1200 bit/sec to 4800 bit/sec. The multiplexer, designated the TM-8, operates in conjunction with the Codex AE-96 9600 bit/sec voice-band modem.

Features of the TM-8 include the capability to interface to switched network modems like the Western Electric 202C. The multiplexer is totally "transparent" so that EIA RS232B modem control signals are passed through the multiplexer in a manner such that no changes in system operating concepts are required.

Expected uses of the new multiplexer include those applications where terminals operating at 1200 bit/sec and higher must access a remotely located central computer through the public switched telephone network. The multiplexer provides a wide selection of channel options for commonly used data speeds, permitting the network designer unprecedented flexibility in obtaining the data speeds required for his particular terminal.

The TM-8 sells for $4,000, and will be on display at SJCC booth 15000.

Data Coupler Connects By Direct Access Or Permanent Cable

PALO ALTO, Calif. – The DC22 universal data coupler will be featured in the Prentice Electronics Corp. exhibit at this year's show.

Prices for single units start at $298. The DC22 can be coupled acoustically, magnetically, by direct access arrangement, or by permanent cable. The DC22 can operate in either full- or half-duplex.

In originate mode, the DC22 runs at 200 baud, in answer mode, it runs at 150 baud.

The unit will accept the standard TTY interface, the EIA RS-232B or the inverted EIA interface.

Auto Plates Computerized

HOUSTON, Texas – The Texas Highway Department said that motorists can purchase 1970 auto license plates by taking the computerized registration form they receive through the mail to the county tax accessor-collector's office.

The computerized forms speed up the registration process.

Colliers Offers DP-Date Service To Wide Area

FORT LAUDERDALE, Fla. – Colliers Publishing Co. recently announced the introduction of a newly developed computer matching and dating service to be offered on a franchise basis in the U.S., Canada, Hawaii, and the Caribbean areas.

Called Computer Date Line, the Colliers service offers to single people a method by which they can meet and date each other through use of the company's IBM 360/20 computer. Over one million people used these computer matching services last year.

Persons using the service obtain a questionnaire from one of the many display stands located throughout each distributor's territory, or they may request a questionnaire through the mail. The completed questionnaire, along with a $10 fee, is returned to the company's headquarters and processed on the computer.

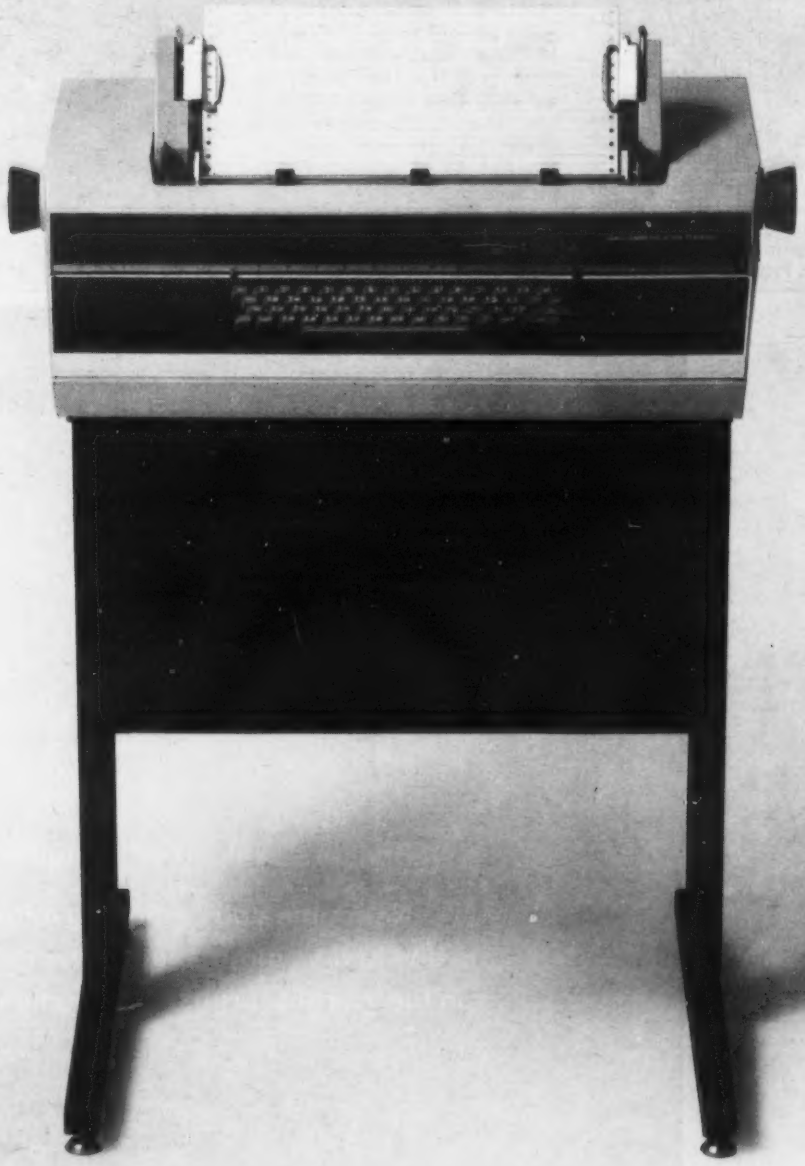
Each subscriber then receives a list of compatible names, which he can contact at his leisure.

The franchises being offered will give the distributor the opportunity of operating a computer matching and dating service which involves only a small amount of time each according to the company. Investments start at $5,750 depending on the size of the territory selected.

Interested persons should contact the company at 23735 Oakland Park Station, Fort Lauderdale, Florida 33307.

Reprinted from Computerworld March 3, 1970

Memorex breaks the speed limit with the 60 CPS Communication Terminal.



The new Memorex 1240.

In commercial use and in time-sharing applications, it's everything you could ask for in a communication terminal.

There's a choice of 10, 15, 30, or 60 cps. With local or remote horizontal tab control.

An original and five copies are produced on paper as wide as 14⅞ inches. And you get all 94 ASCII graphics on a 120 character writing line. The 1240 operates in full or half duplex with Memorex integral modems.

Just as important, the 1240 is easy for people to get along with. It's quiet, even while operating at 60 cps. The operator has maximum print visibility. Print cartridges are completely interchangeable. Paper loading is easy.

The 30 cps model starts at $115 (the 60 cps is $140 per month). And you'll be getting more effective, more reliable communication per dollar than with any other terminal you can buy.

For more information, write: Memorex/Equipment Group, San Tomas at Central Expressway, Santa Clara, California 95052. **See the 1240 at the SJCC in Atlantic City. Booth No. 22,000. May 5-7.**

MEMOREX

Products on Show at Spring Joint

Ampex Shows Cassette Recorder

REDWOOD CITY, Calif. – A digital, cassette tape recorder that Ampex, the developer, says is specifically designed for computer-peripheral use will debut at the SJCC.

Writing at 800 bit/in., the Model TMC writes tape at 12 in./sec. It is priced under $600 in production quantities, according to the company.

The unit offers computer manufacturers a high-quality, high-precision, on-line storage device with a capacity of up to 350,000 characters, according to Eugene E. Prince, division general manager for computer products.

The unit is said to be suitable for key-to-tape applications, local storage for terminals, as a peripheral for minicomputers, and as a data pool for data entry. All operational modes are electrically controlled, permiting complete on-line operation.

The data rate for the TMC is 9,600 bit/sec. Data is recorded on 300-ft tape cassettes. The unit will accept either Ampex PC-800 heavy-duty cassettes or Phillips audio-type cassettes, according to Prince.

Operating modes include read forward, read reverse, write only, fast forward and fast reverse, and erase data.

Detailed specifications are: speed options from 2 in./sec to 12 in./sec, start/stop time of 20 msec at 12 in./sec, ability to sense the tape leader and end of file, file protection from a mechanical switch, and single-gap standard heads in contact with the tape.

Ampex will display the TMC cassette recorder in SJCC booth 3800.

The Ampex Model TMC cassette tape recorder writes at 800 bit/in. with speeds up to 12 in./sec.

Mini Performs Pre-process For T/S System

SANTA ANA, Calif. -- The star of Micro Systems Inc.'s SJCC exhibit is to be the new Micro 812, a communications-oriented minicomputer.

The Micro 812 is priced under $10,000 and is designed as a pre-processor for time-sharing or information systems networks. It can also operate as a stand-alone interactive processing system.

The instruction logic is micro-programmed into a read-only memory in the form of 'firmware'. The firmware accepts serial data from up to 32 low-speed devices with mixed baud rates. The input data is placed into a circulating buffer within core.

The firmware can be programmed by the user to create any type of specialized instruction set the user desires, according to the company.

The 812 offers a 105-instruction set for general-purpose and communications processing. Interrupts are stored in a push-down stack, permitting rapid program response to incoming messages.

The machine offers a basic configuration of 4K 8-bit words. The main memory is expandable to 32K. The memory cycle time is 1.1 μsec. Word lengths of 8, 16, 24, or 32 bits are available for arithmetic load and store instructions, the company said.

Other Series 800 Micro Systems machines to be displayed include the 800, a microprogrammable minicomputer for under $3,000, and the 810, a conventional general purpose pre-programmed mini.

Micro Systems offers its customers a general-purpose interface board that lets the customer design an interface to any type of device and still plug them into the main chassis, according to the company.

The 800, the 810, and the new 812 will all be on display at SJCC booth 24001.

Products on Show at Spring Joint

Courier's Executerm 60 display terminal.

Executerm 60 Plug-to-Plug Compatible With IBM 2260 and 2265 CRT Terminal

PHOENIX, Ariz. – Courier Terminal Systems, Inc. will be displaying its Executerm 60 at this year's SJCC.

The Executerm 60 is a CRT display terminal that is compatible with the IBM 360. The terminal can replace either IBM 2260s or 2265s, according to the company. The IBM 2848 and 2845 controllers are also replaced by the Executerm 60.

Executerm can operate under either OS or DOS, with either Basic or Queued Telecommunications Access Method, according to Courier.

Functional characteristics include a non-destructive cursor, data parity, horizontal tabulation, page roll – the ability to have the top lines of a new "page" move into the bottom of the picture while pushing off the top lines of the old "page" – repeating character generation, and an audio keybpard alarm.

Editing functions include the ability to add, delete, insert, replace, and line-modify characters or pages. Options are line addressing, hard-copy printer, 480-character display buffer instead of the standard 240-character buffer, and a multistation adapter.

The unit is installed and serviced nationally by the RCA Service Co. and will be on display at SJCC booths 1510-11.

Data-Verter Now Includes Central Mag Tape Station

ALBERTSON, N.Y. – A new Data-Verter central magnetic tape terminal for gathering information sent over the telephone network from source recorders will be shown for the first time at the SJCC.

The Model 5237 communicates with acoustical or unattended transmitters and records information on IBM-compatible nine-channel magnetic tape in Ascii or Ebcdic.

"The terminal's rental is under $500/month," said Richard A. Babb, Digitronic's product manager, "and is scheduled for delivery to customers in early summer." It includes character parity, format, and read-after-write checking.

The Digitronics Data-Verter central magnetic tape station accepts data from either unattended source recorders or acoustically-coupled terminals.

The Data-Verter system is being used by retail chain stores, accounting firms, and financial institutions to acquire data at the source for direct computer entry. It eliminates keypunch and key-to-tape operations, reducing data handling costs and errors, according to Digitronics.

The Data-Verter system provides a printed copy record while simultaneously recording information on magentic tape at the source – in the store, office, plant, or warehouse. Recorded information is transmitted via acoustic-coupled or unattended transmitters to a paper or magnetic tape terminal at the computer center.

The company's exhibit is in SJCC booth 5100.

Products on Show at Spring Joint

The Tracor 1210 offers virtual memory and time-sharing on a small computer system.

TCC/1210 Uses Virtual Memory for 16 Terminals

AUSTIN, Texas – Tracor Computing Corp. is displaying its TCC/1210 computer system with complete multiprogramming software at the SJCC.

The 1210 offers virtual memory up to 256K words and time-sharing of from 1- to 16-local and remote terminals. Peripheral equipment includes line printers, paper tape, magnetic tape, and high-speed disks.

The time-sharing executive allows users access to all software packages, the company said. Each user has a dynamic file maintained by the system. The file supports both source libraries and relocatable code for executable programs. All I/O is spooled by the monitor, the company said.

Available software includes Star, a management information system, RPG, Math, a conversational processor that acts as a desk calculator or slide rule, and Fortran (Ansi Fortran IV).

Other products to be exhibited are a tape recorder for incremental instrumentation recording and a print mechanism.

The tape recorder writes and reads synchronously from 4 to 37.5 in./sec. Called the 1701, the drive produces IBM-compatible tapes in either seven or nine-track format at either 556 or 800 bit/in. Reel size is 8.5 inches (1200 ft).

The printer provides a 64-character print set at either 10 or 15 char/sec. The 1601 is plug-to-plug replacable with the Model 33 or 35 teleprinter. A future version, the company said, will offer automatic send/receive. Presently, the unit is compatible only with send/receive units. Another future option is scheduled to be the full 96-character Ascii type set.

The keyboard resembles very closely the keyboard of a four-row Teletype.

Prices for the KSR version of the printer range from $2,000 to $1,500 depending on quantity.

The 1210, the 1701, and the 1601 will be on display in SJCC booths 26009-12.

Data Products Shows Printer

LOS ANGELES – Data Products Corp. will be demonstrating its new high-speed drum printer at the show this spring.

The printer offers a 132-character line at 1110 line/min, according to the company. The 2410 printer is available for 120-day delivery at an original equipment manufacturer price of $9,500, in quantity.

The printer's operating principles are simple. The paper and inked ribbon pass between a row of hammers and a continuously rotating metal drum. The drum has the complete character set etched into a circle at each character position on the line. The buffer in the printer stores an image of the line. The hammers are synchronized with the drum by timing the relative position of the characters in their circle around the drum.

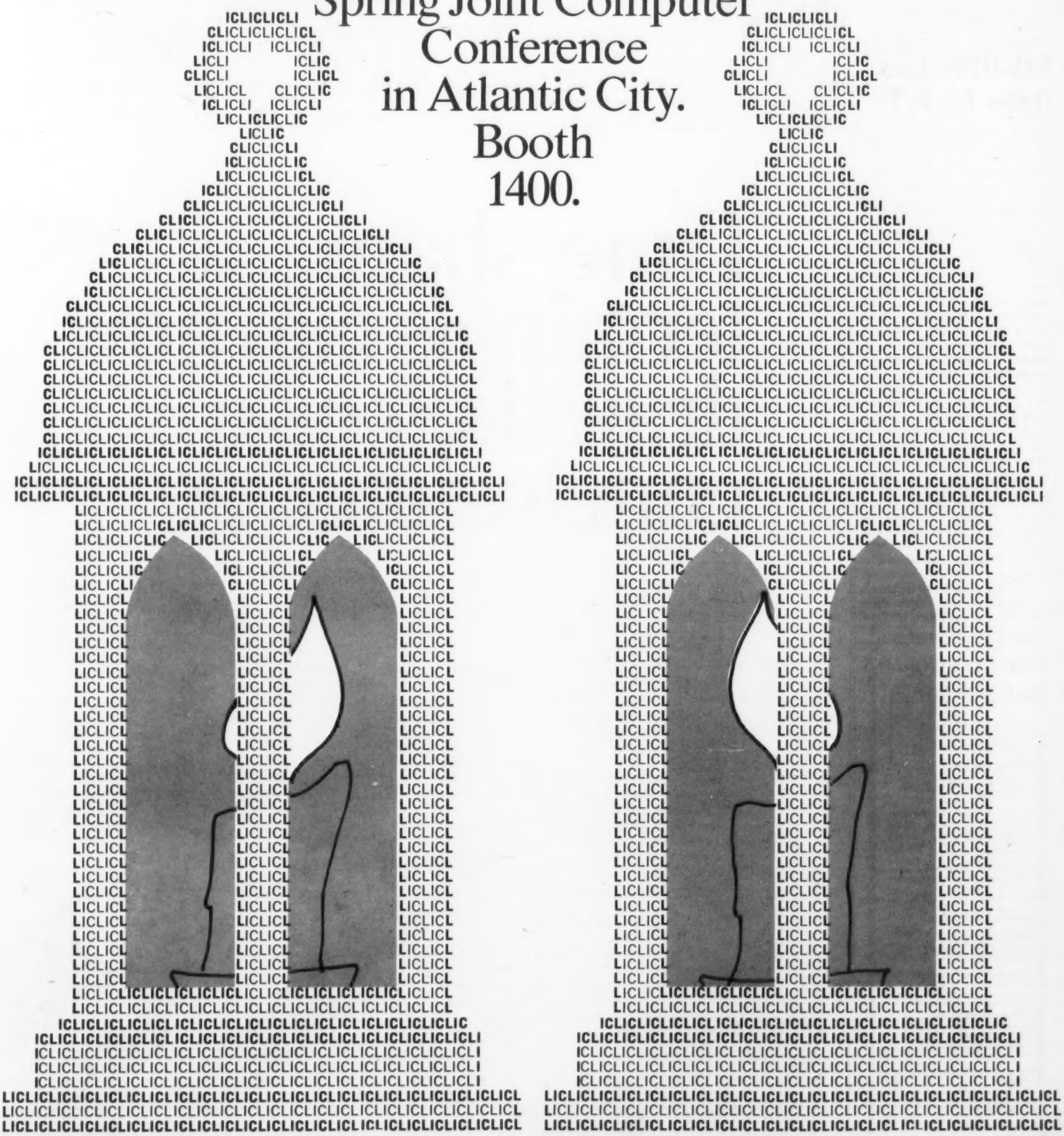
The actual scanning cycle works on 22-position segments. One complete revolution of the drum is required to print a segment.

The price includes the control logic, the buffer, and the complete printer mechanism.

The 2410 will be displayed in SJCC booth 1000.

Since we've been unable to locate Mr. Revere, late of Lexington, Massachusetts, to announce our presence, we should like to inform you that International Computers Limited, will be at the

Spring Joint Computer Conference in Atlantic City. Booth 1400.



Where we shall be delighted to show original equipment manufacturers in the computer field the extent and sophistication of our peripherals. And to let you chaps know that we speak your language, remember: ICL...SJCC...OEM's...BOOTH 1400.

ICL

International Computers Ltd.
839 Stewart Avenue, Garden City, N.Y. 11530

Products on Show at Spring Joint

Marshall to Introduce 2314-Compatible Disk Storage

SAN MARINO, Calif. – Marshall Data Systems, a division of Marshall Industries, is introducing an IBM 2314-compatible disk drive to complement its existing 2311-compatible drive.

The average access time for the M2700 is less than half of that for the 2314.

The new unit, the M2700, is a single-spindle model which, when coupled with the M2800 controller, replaces 2314s, the company said.

The M2800 controller can drive up to nine spindles simultaneously, providing the same overall capacity as the 2314. Marshall intends to lease the M2800 system for about 10% less than IBM's standard lease price.

The drive has a 29-million character capacity, with a transfer rate of 312K byte/sec in serial format. Each cylinder can store 145K bytes. The average access time is 30 msec with a maximum of 60 msec.

The access mechanism is electromagnetic, rather than hydraulic as is the 2314's, permitting much faster movement and control, the company said. The M2800 Disk Storage System is completely compatible with the IBM System/360 selector channel, according to Marshall.

The new system, as well as the M2500, will be on display at SJCC booths 44001-3.

RRS-1150B Uses Optics for P/T

HAWTHORNE, Calif. – Remex Electronics, a division of Ex-Cell-O Corp., has announced it will introduce a low-cost photoelectric punched tape reader/spooler at the forthcoming SJCC.

The Model RRS-1150B punched tape reader/spooler features 150 char/sec reading speed and inherently quiet operation suitable for office or computer room environment.

Although the RRS-1150B is priced competitively with the lowest cost mechanical type readers, it offers such features as integrated circuits with TTL, DTL, and RTL compatibility, long life cartridge lamp, low inertia stepping motor/sprocket wheel drive for rapid response for both directions of reading, and fully proportional servo controlled reels.

The RRS-1150B is priced at $815 including electronics and power supply. Quantity discounts are available. Production quantity deliveries are scheduled to commence in late August of this year.

This new model will be shown in operation along with other new Remex products in SJCC booths 25001-02.

COMPUTERWORLD'S SALES OFFICES

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Neal Wilder
Sales Administrator:
Dorothy Travis
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New England Regional Manager
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Los Angeles Area:
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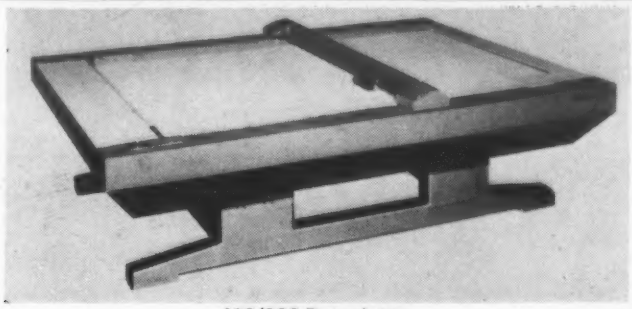
(213) 657-6221

San Francisco Area:
Bill Healey
Thompson/Healey Assoc.
1111 Hearst Bldg.
San Francisco, Calif. 94103
(415) 362-8547

Products on Show at Spring Joint



430/200 Dataplotter

EAI Dataplotter Draws at 16 in./Sec

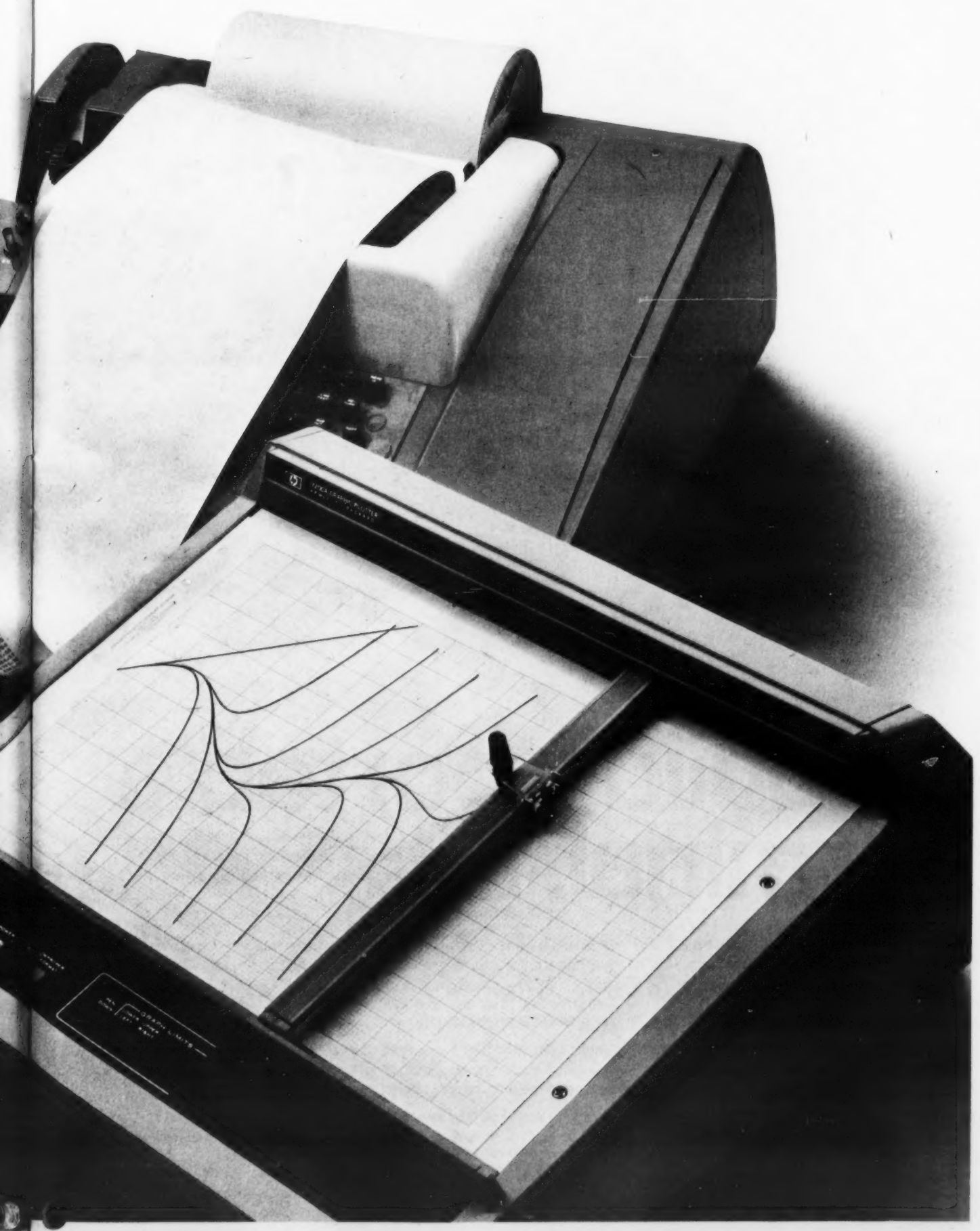
WEST LONG BRANCH, N.J. – Electronic Associates, Inc. will be featuring its industrial design and graphics capabilities at the SJCC this year.

The company will debut its new 430/200 Dataplotter. The 430/200 offers a 54 in. by 76 in. plotting surface, a 48-character symbol set for annotation and marking, and a four-color pen assembly. The multi-pen drawing head allows either multiple colors, or different widths of line drawing. The unit draws at up to 16 in./sec and resolves images down to 0.00125 in.

EAI will also be showing its hybrid computer – Model 590 – that sells for under $100,000. The 590 is programmed to run a drag race. The programming is intentionally non-optimal for the quarter mile course. Attendees can select design parameters for designing their own dragster, and if careful, can beat the 590's own designs.

This demonstration is actually the basic parts of any automotive design system – one of the major potential applications for the 590.

The company's display will be in booth 1800.



Bit Serial Recorder For Minicomputers Introduced by ICP

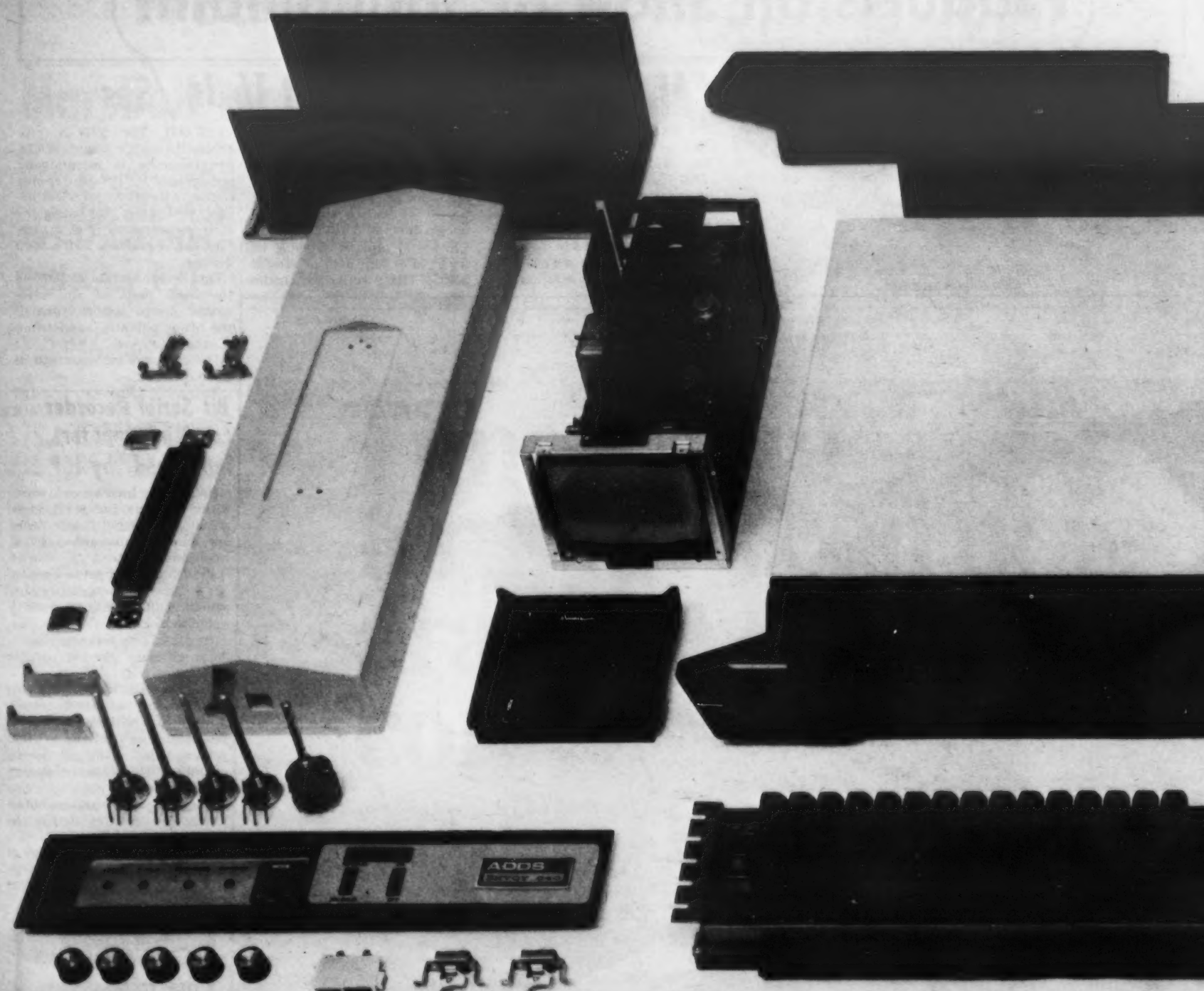
DALLAS – International Computer Products, Inc. is introducing a new bit-serial data recorder for minicomputer and terminal applications.

Available in original equipment manufacturer quantities for under $300, the unit uses a spindle drive rather than a capstan drive. This technique maintains constant tension on the tape.

The Digideck weighs only two pounds, has adjustable servo-controlled tape speed, read/write electronics, writes at up to 7000 bit/sec, and reads at up to 20,000 bit/sec, the company said.

The company is also manufacturing the cassettes used in the Digideck transports.

The unit will be on display at booths 1605-1606.



How to build a portable CRT terminal.

Electronics. We tend to take these for granted because when we made our portable we took the guts right out of our MRD-200 readout display. You may have a problem here.

A piece of cake. First, you establish your goals. You want a full-scale computer terminal that plugs into an ordinary outlet, uses an ordinary telephone and has full editing controls. You want it to be simple, quiet, rugged, fully compatible with Teletype* systems and you want to be able to carry it easily. Also, you need one model that will display 512 characters and will sell for about $3200; another model that will display 1024 characters and will sell for about $3700.

Don't despair. We know it can be done. Here's what you need:

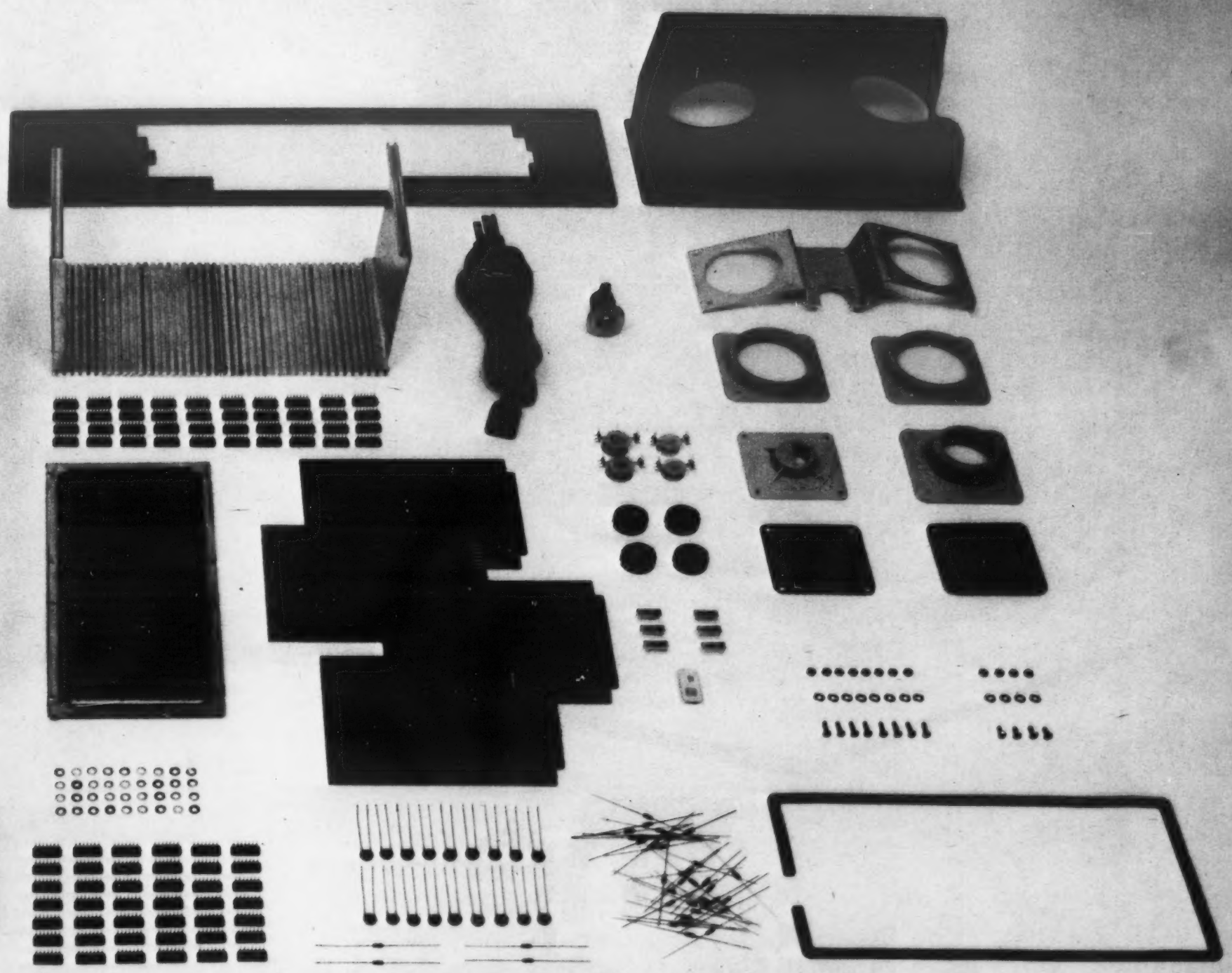
An acoustic coupler that is 10 times better than anything around—one that can operate on 40 dB attenuated lines in half duplex. You'll have trouble finding this because we're the only one who makes it. Also, you'd better use complete acoustic shielding because your terminal is going to be used in a lot of noisy places.

Now you'll want a CRT. Get a proven commercial TV monitor. It will buy you a lot of reliability and let you use TV raster techniques which make for sharp, legible characters. You might also consider using black characters on a light background and a page format for display. Both drastically reduce eyestrain.

Then you'll need a heavy duty keyboard, because the terminal is going to be taking a pounding. So find one that is solid state, rugged and can take extremes of temperature. Better buy the best available.

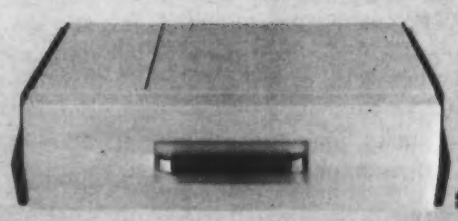
Suppose you drop it in a puddle. This is not recommended, but no matter. The frame is all of cast magnesium parts. It's fully gasketed and weatherproofed. There's a scuff-proof vinyl finish on the outside. The keyboard travels on jam-proof nylon bearings. Circuit boards float on foam pads and are clamped into a locked position.

*Registered trademark of Teletype Corporation



Piano movers need not apply. After you put all these components together in a self-contained carrying case, your terminal will weigh 30 pounds and will measure 6" x 17" x 22". You can slide it under your airliner seat.

So who needs it anyway? That's what they said about the telephone. Nobody needs it or everybody does, depending on your viewpoint. Take the traveling salesman who sells from inventory. Consider what remote, mobile access to a computer would do for him for checking credit, inventory and closing an order on the spot. Then, there's the scientist working in the lab, the engineer at the construction site, the programmer working at home, the time sharing salesman. And on and on. A lot of people would use your portable terminal. If you can build one.



See a demonstration at SJCC.

ADDS
Applied Digital Data Systems, Inc.

Mr. Richard Kaufman, Dept. 30
Applied Digital Data Systems, Inc.
89 Marcus Blvd., Hauppauge, N.Y. 11787 (516) 273-7799

Please send me more information about your portable terminals—the Envoy-600 and the Envoy-640.

Name_____

Title_____

Company_____

Address_____

City_____ State_____ Zip_____

The skin-deep part

The reality of appearance. A computer terminal is truly beautiful only when it combines aesthetics with fine engineering at the right price.

To arrive at that combination we started with the electronics. We took them right out of our MRD-200 readout display because of its proved reliability.

The keyboard is the same one we use in our portable terminal. It will take a pounding without getting wobbles of the keys.

The 9" TV monitor is a commercial product of long established dependability. We like its reliability and it lets us use standard raster techniques for high character legibility.

We added a built-in acoustic coupler option. The coupler is the best made. It operates over 40 dB attenuated lines in half duplex instead of 30 dB lines like other couplers. We make the coupler ourselves. It operates at 110 and 300 baud.

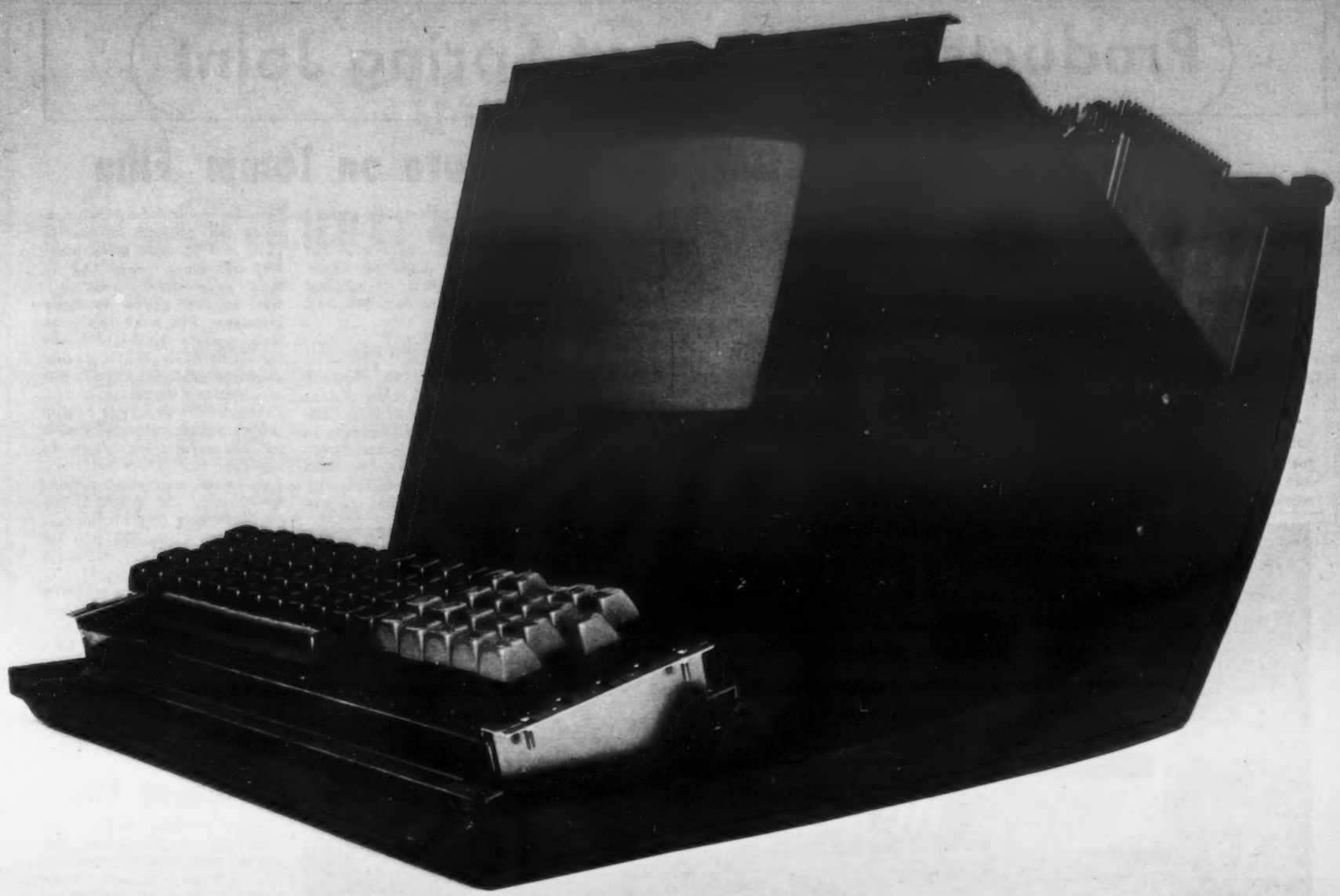
Then we put all this together in a snug case that lifts up for easy maintenance, added a plexiglas front panel, and we had our terminal.

In fact, we had three terminals, the Consul 800, the 840 and the 880. They display respectively 16 lines of 32 characters, 16 lines of 64 characters, and 20 lines of 80 characters. They cost respectively $2995, $3495 and $3995. And they are all Teletype* compatible.

A la mode. The Consul will operate in three modes, page, message and conversational. The conversational has a special editing sub-mode. When you move the cursor to correct a mistake, the terminal automatically switches to the sub-mode. After retransmitting the corrected line, the terminal automatically switches back to the conversational mode.

In the message and page modes, you can edit several lines or a whole page of data before transmitting it. In both of these modes a

*Registered trademark of Teletype Corporation



The beauty part

look ahead feature saves transmission time. It scans ahead and if the rest of a line is blank, the cursor goes directly to the next line.

Fill in the blanks. Our terminal also has a formatting feature for fast, efficient data entry. The computer puts up a form, you fill in the blanks with variable data. The tabbing control skips over fixed data and lets you move directly from one variable data field to another. Only variable data is transmitted.

Thoughts on an Ode on a Grecian Urn. Making a good computer terminal is a matter of skill, experience and maybe a little luck. You design all sorts of engineering and operating features to make it a better terminal. And, in the end, you have a machine that is not only superb electronic equipment, but a joy to behold.

ADDS
Applied Digital Data Systems Inc.

Mr. Richard Kaufman, Dept. 34
Applied Digital Data Systems Inc.
89 Marcus Blvd., Hauppauge, N.Y. 11787 (516) 273-7799

☐ Please send me a brochure on the Consul terminal.
☐ Please have a salesman call me.

Name_____

Title_____

Company_____

Address_____

City_____ State_____ Zip_____

See a demonstration at SJCC

Products on Show at Spring Joint

The Beta Com 700, Beta Instruments' new microfiche/microfilm computer-output microfilm printer, allows the user to control the format of the microfiche frame to any desired degree. The system includes software to produce indexes for the 224-page frames nearly automatically, the company said.

COM Squeezes More on 16mm Film

NEWTON UPPER FALLS, Mass. – Broad flexibility for microfiche and microfilm output from computer-produced magnetic tape typifies the new COM printer from Beta Instruments. The system will be displayed at the SJCC for the first time.

Called the Beta Com 700, the system can accept any size film from 16mm to 105mm in rolls up to 200 ft long.

Density Increase

With the 700 introduction, Beta has added a high-density capability for 16mm general information retrieval uses. Instead of having only one page per frame of film, the system can produce four pages per frame. This reduction is achieved through the use of a new 42X reducing lens.

72 Pages on One Fiche

The standard 24X reducing lens will store 72 pages of text on a single 105mm fiche. The 42X lens will store 224 pages on the same fiche. The device runs at the same text-speed with either lens. Each high-density frame takes four times the normal 20 seconds for a 24X frame.

Beta also provides software to build and produce index pages for microfiche. According to Beta, using the indexing software requires almost no reprogramming. The software also allows the user to establish any format he wishes. Titles are produced by replacing either a row or a column with title text.

Complete fiche format control is obtained by making it possible for the camera mechanism to move the film in four directions. This lateral movement permits free-format, and simple indexing, according to the company.

The Beta Com 700 sells for $141,500 and is available for delivery this summer.

Both the 700 and the 600 offer a broad range of software packages and capabilities, by using a Digital Equipment Corp. PDP-8 as the internal computer system.

The COM units will be on display at SJCC booths 120-1.

Fastrack Stores 48 Million Bits

SAN DIEGO, Calif. – The Fastrack Model 8100 disk storage modules will be featured this year at Computer Peripherals Corp.'s booth. Available in 24 million and 48 million bit head-per-track modules, these memories can be coupled up to 96 million bits.

Data can be transferred at either 3MHz or 6MHz, the company said. Optional write-lockout features can protect the stored data when the unit is accessible to several controllers at once.

Prices, in original equipment manufacturer quantities, range from 0.1 cent/bit to 0.05 cent/bit.

The company said that the device has an extremely low error rate, less than one recoverable error in 10 billion bits. Normal removable-type disk packs average one error per million bits, the company said.

The new unit will be on display at SJCC booths 4611-12.

A CPC engineer installs the air purge and purification system for a CPC Fastrack head-per-track disk memory. The pneumatic system provides the head actuation pressure, as well as maintaining the dust-free conditions within the enclosure, the company said.

We sell safety.

Graham tape is a means to an end.

We figured up how much a typical program costs to write. We looked at the cost of computer time. And we considered how much depends on an EDP operation's output.

Then we made the safest tape in the world — a tape that's good for a million passes, with no permanent errors.

We made a Zero Defects tape — one that generates no rub-off. We developed the exclusive Verituf binder system that makes this possible.

We made a tape this good because we figured your reputation deserves this kind of safety.

Some of the smartest men in the EDP industry agree with us. That's why they're running Graham tape today.

How about you? Order a hundred reels of Graham, today. For safety's sake.

GRAHAM MAGNETICS

means to an end.

Graham, Texas 76046 WATS Phone 800-433-2701 Texas Phone 817-549-3211

Products on Show at Spring Joint

'Draft Aid' Translates Rough Sketches to Drawings

SOUTH WINDSOR, Conn. – A computer drafting system that permits draftsmen untrained in computer technology to produce top quality drawings will be exhibited in public for the first time at the SJCC.

The system, called Draft Aid, is a new product introduced by The Gerber Scientific Instrument Co. Its job is the direct translation of rough sketches into camera-ready, ink-on-vellum drawings.

Real-Time Operation

The self-contained system is specifically built for simple real-time operation by draftsmen, designers, and publications personnel, among others.

It is particularly useful for producing drawings containing repetitive symbology and text. The system can be installed in a drafting or publications department since it is not dependent on outside computer support.

Typical applications of Draft Aid include logic diagrams, technical publications, electrical and electronic schematics, piping and hydraulic layouts, flow and Pert charts, architectural layouts, annotation, statistical charts, and many other areas where drawings are required swiftly and accurately.

With an overall accuracy of ±.004 in. at speeds to 600 in./min, Draft Aid can draw an average "C" size schematic in six to eight minutes after completion of data input, with greater precision than can be obtained manually, according to the company.

Draft Aid utilizes standard, field-proven computer-controlled automatic drafting equipment supplemented with a magnetic tape storage unit and software specially developed to produce finished drawings ready for reproduction by photographic or diazo processes.

The system is composed of a Series 1200 stored program control featuring a Hewlett Packard computer with 8K memory, teletypewriter, and 400 char/sec photo-electric tape reader and spooler which processes the input data and outputs command directly to the drafting table.

3 Different Tables

Three different tables can be used in the system to meet the user's requirements.

The Model 23 with a 34- by 44-in. drawing area is the standard system table. Two larger electrically tiltable tables, the Model 22, which has a 48- by 58-in. area, and the Model 75 with a drawing surface up to 5 by 24 ft are optional.

The equipment and the software eliminate remote or separate pre- or post-processing of data. Linear and quadrant circular interpolation are provided by the software, with circular interpolation possible in drawing, symbol and alphanumeric modes. These features increase system throughput and simplify Draft Aid operation, according to Gerber.

Taking a rough sketch prepared on coordinate paper, a draftsman identifies the symbols by library "type number" and assigns an arbitrary "sequence number."

Using Draft Aid language, the draftsman codes the sketch for input to the system. The proper symbol library tape cartridge is selected and inserted into the tape storage unit.

This coded information is fed into the system via the teletypewriter. Optionally, for off-line operation, a previously prepared tape is entered. The proper command then simply initiates the drawing process and the finished ink drawing is quickly produced in a few minutes.

The Draft Aid will be displayed in booths 4008-11.

Products on Show at Spring Joint

Varian Says 620/f Fastest Minicomputer at 750/sec

IRVINE, Calif. – Varian Data Machines now lays claim to the fastest minicomputer on the market. The Varian 620/f will lead the company's exhibit at this year's SJCC.

The 620/f is the latest addition to the company's line of 620 computers. It is also, by a factor of over two, the fastest. Cycle time is only 750 nsec.

"Speed is only half the story," commented George J. Vosatka, company president, in announcing the new computer. "The 620/f represents a complete restructuring of the 620 line, reflecting the latest advances in state-of-the-art planar memories, MSI circuitry, and high-speed I/O transfers."

"The new computer, for example, is not only fast, but also features an extended set of instructions. These combine with the speed to effectively triple the computer's data processing capabilities."

The new instructions do not, however, affect the compatibility of the new computer with previous 620 models. "We wanted to make sure," said Vosatka, "that the 620/f would take full advantage of the software, peripherals, and system interfaces that are currently in use in 620 locations

"Too many new computers come on the market with outstanding performance features, but it is a year or more before their full potential can be realized. The 620/f, by contrast, is a 'now' computer, ready to be put into immediate service. Software and other programming aids are fully developed and tested on the computers in the field. Peripherals and special-purpose system interfaces are equivalent to those of a computer system that has been in existence for five years or more, which in reality is the case."

Other features of the new computer include an optional 300-nsec read-only memory, for an effective processor time of 500 nsec, a priority memory access (PMA) mode that permits data transfers asynchronously to and from memory at rates up to 1.3 MHz, design economies for expanded configurations, a number of console enhancements, and a compact new packaging design that allows up to 8K of memory, all mainframe options, and two I/O controllers to be included in the basic computer chassis.

Varian will be displaying the 620/f as well as many older products in booths 1603-4, 2107-8, and 3004-7.

Data Station Uses Either 7- Or 9-Track Tape

ATLANTIC CITY – The I/O Systems Division of Sangamo Electric Co. will be spotlighting its line of data stations and related equipment at the Spring Joint Computer Conference.

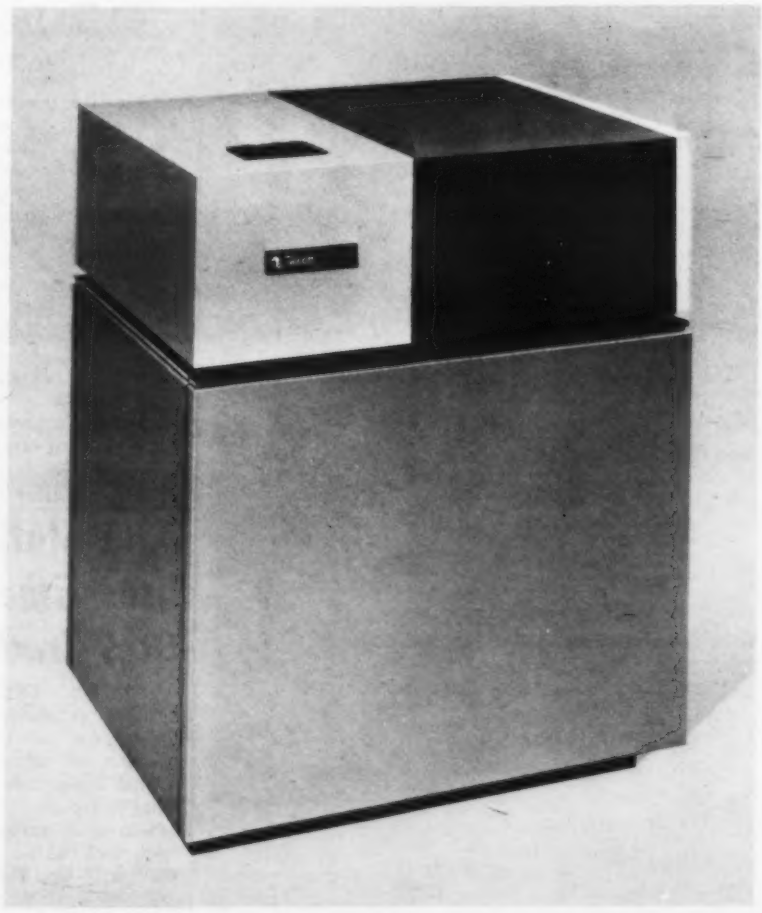
Designated series DS7100 (7 track 200 bit/in., 556 bit/in. or 800 bit/in. and DS9100 (9-track 800 bit/in.), the data station incorporates third generation circuitry and an alphanumeric display panel which improves operator speed and accuracy.

The combined keyboard, alphanumeric display, core memory and magnetic tape unit are incorporated in a compact, low-profile console that occupies the same floor space as a keypunch machine.

Other equipment to be shown includes the Data Communication Terminals, Line Printers and Poolers. Accessories include automatic program loading and an adding machine. The equipment will be displayed in booths 400, 1309-10.

3 will get you 5

(with the 9311 Disc Drive)



There's no gamble at all with the Talcott 9311 Disc Drive. It's a sure thing! Based on average lease lengths, you can put *five* 9311's to work for the usual cost of only *three* 2311's. And, because the 9311's have no premium charges for extra shift work, your savings can actually become far greater.

Now consider these important facts:

- The Singer Company, Friden Division has engineered the 9311 to give greater reliability —with a unique servomechanism instead of a hydraulic system. Complete plug-to-plug compatibility. Can be immediately intermixed or directly interchanged with the 2311 or similar disc unit.
- Full, dependable service—by the worldwide Friden Customer Service Organization.
- All leasing arrangements—to give you maximum savings—by Talcott Computer Leasing.

Ready to "unbundle" your 2311's? 3 will get you 5....

Just contact your local Friden office or write to: Friden Division, The Singer Company, San Leandro, Calif. 94577.

Talcott

TALCOTT COMPUTER LEASING
Division of James Talcott, Inc.
1290 Avenue of the Americas, New York, N. Y. 10019

Products on Show at Spring Joint

200 Line/Min Printer Sells for Less Than $6K

ASHLAND, Mass. – Nortec Computer Devices Inc. has developed a line printer that runs at 200 line/min on a 132-character wide page. The product will be demonstrated for the first time at this year's SJCC.

In quantity, the unit sells for $6,000. The printer uses the orignal concept, developed by IBM, of a chain printer rather then the more common drum printer.

The use of a print chain significantly reduces vertical misalignment of the output characters. The speed of 200 line/min is offered with the 64-character set. An optional 96-character set operates at a lower speed, the company said.

A "frictionless" print hammer is triggered by the release of an electromagnetic clamp. The hammer is reset for each line by passing a bar behind the hammer, and "cocking" it in striking position. This technique, the company claimed, produces up to six copies of high clarity.

The Nortec 200 printer will be the company's first product and will be on display at SJCC booths 26002-3.

Nortec 200 Line Printer

"As a matter of fact that's our whole sales pitch . . ."

Datacraft Places New Microsecond Mini on Market

ATLANTIC CITY – Datacraft will announce its second new computer at this year's Spring Joint Computer Conference, according to the company.

The unit, called the DC 6024/3 digital computer, offers a basic full cycle time of 1.0 μsec with 24-bit fixed-length words. The unit isa said to be designed for real-time control and complex calculations.

The basic system sells for $32,800, includes five registers, and 8K words of memory. The memory can be expanded to 64K. Hardware features include multiply/divide, square root, four levels of priority interrupt, and a console ASE 33 teletypewriter.

The Datacraft 6024/3 is the newest in the company's line of minicomputers. This unit, as well as the 6024 and some of the company's core memory systems, will be on display in booth 24007.

The new system, as well as exisitng systems, will be on display at SJCC booth 24007.

On-Line Interface for 360

SAN DIEGO, Calif. – Stromberg Datagraphic Inc. has an on-line interface available for the IBM 360/25 and up.

The 4440 on-line interface allows for communication between the Datagraphix 4440 micromation printer and an IBM 360 using a standard 360 selector or multiplexer channel.

The on-line interface will be available in the third quarter of 1970 for a purchase price of $20,000 and a monthly maintenance charge of $55, according to the company. Lease plans are also available.

Products on Show at Spring Joint

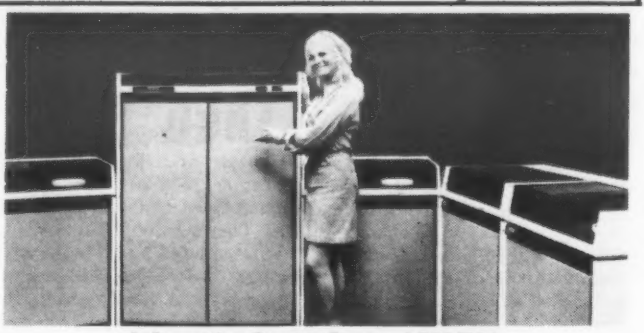
Information Storage Systems' 728/714 Offers Users an Alternative to 2314

CUPERTINO, Calif. – Information Storage Systems, Inc. will be displaying the ISS 728 control unit and the ISS 714 eleven-high disk storage drive at the SJCC. The 728 control unit and the ISS 714 disk drive enable a computer user to operate his disk drive peripherals independent of IBM service or support.

The 728/714 system is plug-to-plug compatible with the 2314 on an IBM selector channel. Since the 728 controller is designed as a stand-alone unit, with individual drives attachable one at a time, the customer has flexibility over his system size and configuration.

The controller has the in-line diagnostic capability to service disk drives while continuing normal operation of other drives on the system.

ISS claims to use the latest techniques in control unit design. Medium scale integration electronics are employed and the logic is functionally packaged to ensure ease of serviceability. The design also employs self-contained internal diagnostic microprograms which aid rapid fault isolation within the unit.



Information Storage Systems' 728/714

The Model 714 disk drive features a 32 msec average access time. With fast access time, users will achieve substantial improvements in throughput over other designs, the company said.

ISS will be at SJCC booths 11008-10B.

711 Terminal Users to Receive First Peripheral – a Tape Drive

NORTH SYRACUSE, N.Y. – Daedalus Computer Products, Inc. will be demonstrating its first peripheral for its new 711 Programmable Data Terminal at this year's show.

An IBM-compatible Model 119 Magnetic Tape Controller, the new unit provides large-scale storage to enhance the communications use of the Daedalus 711. The unit works in conjunction with the built-in modem, memory, I/O interface, and 30 char/sec printer.

The 119 runs 9-track 800 bit/in. tape in standard 10 1/2 in. reels. Tape speed is 5 in./sec, and the data format is completely compatible with the 360, the company said.

The controller will be priced at $10,000, on the average, and will be available within 80 days of order. The 119 will be on display at SJCC booths 25006-7.

Signal Processor Gets First Showing

BURLINGTON, Mass. – Computer Signal Processors, Inc. will debut its CSP-30, a special purpose computer with 100 nsec integrated-circuit (IC) memory and 900 nsec core memory, at this year's Spring Joint Computer Conference.

Aimed at the signal processing field, where hundreds of input signals from instrumentation are processed on-line, or where large volumes of signal data are analyzed, the system sells from $85,000 to about $175,000. The company expects the average system to sell for about $100,000.

Industry Comparisons

CSP-30 is word-oriented, with either 8-bit or 16-bit words available. The two memories can be used either separately or in conjunction. The core fetch can be executed in the "background," permitting overlap. With overlap, core access averages about 300 nsec rather than 900 nsec, the company said.

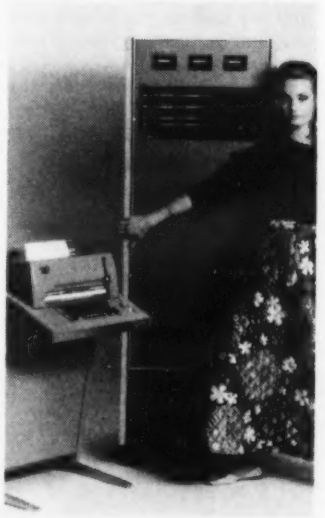
The company cited the speed of the CSP-30 by using a long function analysis, a 256-complex Fast Fourier Transform. The CSP-30 performs it in 6 msec. Comparable machines from other manufacturers were able to perform the same routine in from 22 msec to 60 msec, the company said.

Computation Example

Using another example, the computation of $F_k = a \cdot X_k + b \cdot Y_k + c \cdot Z_k$, where k varies from 1 to N, the CSP-30 is said to perform the calculation in 5.1N μsec, the PDP-10 in 40.9N μsec, and the Sigma 7 in 22.33N μsec.

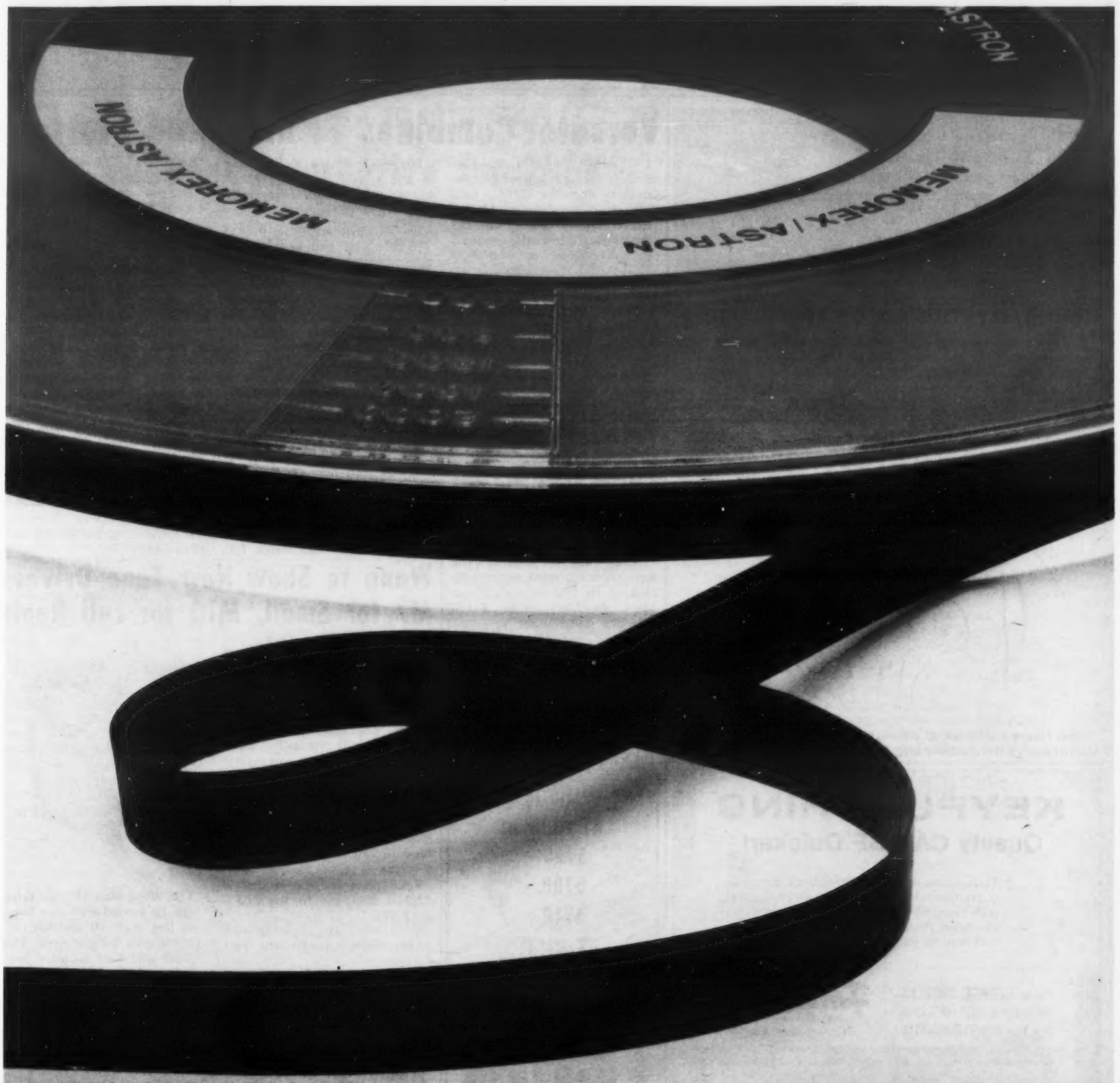
I/O capabilities include up to three expandable high-speed channels with a transfer rate of over 1 million word/sec, one eight-party channel for lower speed devices such as the Teletype console and magnetic tapes, programmed single-word transfers, and programmed sensing of external device status.

Software includes a loader, a text editor, a debugging package, a stand-alone assembler, several Fast Fourier Transform programs, digital filtering, averaging programs, and amplitude histograms, the company said.



The CSP-30, a new 100 nsec computer, is to be introduced at the SJCC, according to the company. The machine is available either as shown, or with a console and display system.

The product will be on display at the SJCC Booths 201-202, in Atlantic City.



Introducing Astron.
Now tape's forgotten side isn't forgotten anymore.

Memorex has improved computer tape. Again. This time by turning to the forgotten side. And developing Astron.

Astron's unique, new back coating is scratch-resistant and anti-static. It eliminates two of the most common causes of tape error in high-activity applications. Base film debris. And foreign matter attracted by static charge.

The new back-coating also minimizes permanent tape damage. It eliminates cinching that's caused by layer-to-layer slippage in tape packs. Also off-setting of individual tape layers during fast rewind – a common damage producer when reels are handled by operators.

What's the combined effect of Astron's high-durability oxide coating and our new back coating? Unparalleled tape drive operational efficiency. And longer tape life.

Memorex Corporation, Memorex Park, Santa Clara, California 95050.

MEMOREX

Products on Show at Spring Joint

Analog/Hybrids Ease Programming

The Electronic Associates' 590 analog/digital hybrid system uses the analog capability to simulate and the digital ability to simplify programming and data entry. The automotive design system shown is programmed to prepare competitive drag racers for the SJCC.

"Now You're All Probably Asking How We Manage to Offer This Unit at Such a Ridiculously Low Price . . ."

Versatec Combines Printers and Plotters

CUPERTINO, Calif. – Versatec is introducing many new products for the SJCC. Two printers, two plotters, and two printer/plotters make up the new products in the company's line.

One printer operates at 300 line/min, prints 80 columns on 8-1/2 in. paper, accepts Ascii or other input codes, offers the full 64-character set, and prints using a 5 by 7 dot matrix.

The other printer has all the same characteristics except that it prints at 600 line/min.

The two plotters, one running at one in./sec, the other at two in./sec, operate asynchronously on 8-1/2 in. paper.

The first printer/plotter runs at 300 line/min and one in./sec. The second printer/plotter runs at 600 line/min and two in./sec.

The price range on these products is from $5,000 to $8,000.

The entire group will be on display at SJCC booths 116-7.

P-150 Punches Paper Tape At 150 Char/Sec

ALEXANDRIA, Va. – Advanced Space Age Products, Inc. announces the most recent addition to its line of mylar/paper tape punches. The P-150 punches mylar/paper at speeds up to 150 char/sec.

The unit sells for about $2,250, is complete with electronics, and is DTL- and TTL-compatible. Delivery time is stated to be four months.

Advanced Space Age Products, Inc. will occupy booth 35003.

Tape Drive Components Format Data for Both 7- and 9-Track

CHATSWORTH, Calif. – Peripheral Equipment Corp. (PEC) plans to lead off its exhibit this year with the introduction of two new magnetic tape data formatters, according to the company.

Designed to help system builders incorporate more useful features into new systems, the two formatters allow a single tape controller to handle both 7-track and 9-track 800 bit/in. format, and the IBM 9-track phase-encoded 1600 bit/in. format.

Each formatter can handle up to four PEC tape transports of the same speed and interface configuration, the company said.

The units are rack-mounted, support any two of the three standard packing densities (200, 556, 800 bit/in., and have speeds ranging from 12.5 in./sec to 37.5 in./sec (2.5KHz to 30KHz).

All transports operate in IBM-compatible mode.

The company will be in booths 1711-1712.

Wang to Show New Tape Drives, M7 for Small, M10 for Full Reels

LOS ANGELES – Wang Computer Products will show its Mod 7 and Mod 10 tape systems this year at the SJCC.

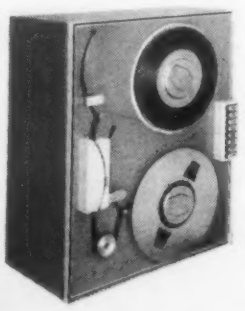
Using up to seven-inch reels and moving tape at up to 12.5 in./sec, the Mod 7 can offer read-after-write for both 7-track and 9-track IBM-compatible tape.

The Mod 10 handles full-size reels, 200, 556, or 800 bit/in. densities with 1600 bit/in. phase-encoding optional. The Mod 10 can be either 7-track or 9-track.

Basic price for the Mod 7 is $2,210. Basic cost for the Mod 9 is $3,475.

Both units are available with either Usascii or Ebcidic data formats.

The tape drives will be on display at booth 45014.



The Wang Mod 10 tape drive can be loaded with one hand in less than 10 seconds, according to the company. The drive offers all standard densities and both the major coding formats.

Products on Show at Spring Joint

Add-On Memory Gives IBM's 360/65,75 Users Cheaper Alternative for 256K

ST. PAUL, Minn. – Univac 1108 and IBM 360/65 and 75 users at the SJCC will have an opportunity to examine the prices and specifications for a new compatible main memory.

Not intended for the large capacity storage market, but instead intended as an add-on memory for users who need to expand the basic memory of the system, the new memories are guaranteed to be completely compatible with existing mainframe memories. They are maintained by Weismantel Assoc., Inc.

The company said that it expects the price for these new memories from the CPU manufacturer.

The memory operates at 750 nsec, and is available in 256K modules for the 360, and 64K-word modules for the 1108. The access-word length of the 360 version is the standard double-word (eight-bytes) and for the 1108, two 40-bit words.

The memory will be priced between $300,000 and $340,000 depending upon installation costs and final production costs, according to Robert Swartz, company vice-president for marketing. Lease prices are quoted as being the same percentage below manufacturer's prices as purchase prices.

The equivalent IBM memory system, one 2365 Model 2 Processor Storage, sells for about $400,000 with a monthly maintenance charge of about $600. The same unit rents for about $9,600.

Initial deliveries are scheduled for June for the 1108 version, and for fall for the 360 version, Swartz said.

The company is also introducing a remote communications concentrator at the show. Designated the RCC, the device will multiplex up to 32 low-speed remotes onto a single 4.8 kilobit line.

Delivery cycle for the RCC will be about six months, and it will sell for $15,200.

The company is debuting two new medium-priced digital computers, in addition to the memories and the RCC.

One of the systems, the W-16, is a time-sharing multiprocessor with an internal cycle time of 500 nsec. The W-16 is claimed to be able to handle more than 256 full duplex lines, and has a 16-bit word size.

The price ranges from $75,000 to $400,000. Printers, disks, card I/O devices, paper tape, magnetic tapes, and analog/digital converters are available with the systems.

The company's display will be in booth 1204.

Honeywell CCD To Display 632

ATLANTIC CITY – Honeywell's Computer Control Division (CCD) intends to occupy about half the Computer Group's 2,600-sq-ft exhibit at the SJCC.

The space will display products, newly announced products, examples of existing time-sharing and peripheral equipment, and samples of other CCD products like integrated-circuit modules, core memories, converters, and controllers, according to a company announcement.

On display will be a complete 632 system in operation. Several 316s, both operating and non-operating, are being included.

The company will have six terminals available that are to be connected to a remote H-1648 time-sharing system.

The exhibit is to center around Series 16 and Series 32 minicomputers, according to the company.

The exhibit will be found in booth 3700.

"What, No Stereo Record Player?"

Products on Show at Spring Joint

'Fastplot' Debugs Plotter Program Fast

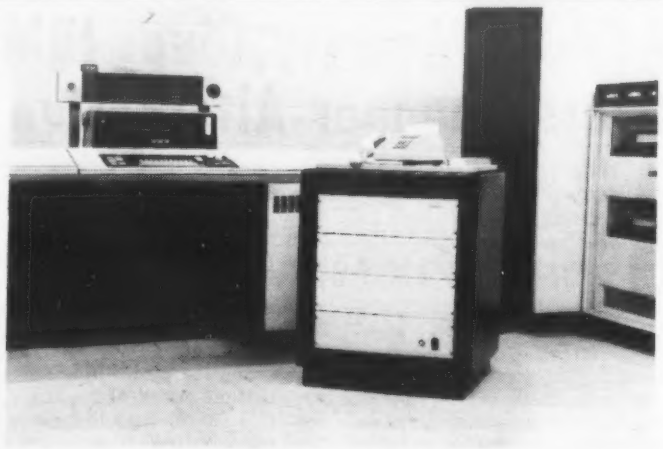
HUDSON, Mass. – Datatrol, Inc. is displaying its Fastplot 1200 and one of its voice-response systems at this year's show.

The Fastplot 1200 provides computer diagnostics for plotting programs. With the system, the user enters his plot program. The software debugs the program and then directs the output to the plotter.

The audio-response systems come in several configurations. The smallest is a simple unit that attaches to a central computer. The most complicated is a dedicated system, with its own computer, file storage, and software.

Voice-response systems start at $10,000.

The company's display will be in SJCC booth 10006.



The smaller audio response systems from Datatrol are simple boxes. THey can be connected to almost any computer system, and act as self-contained peripherals.

"Don't Get Panicky – We Have It on Ten Day Free Trial –"

What makes the Scan-Data 200 OCR page reader different?

The difference.

COMPARISON OF SYSTEMS CAPABILITIES— COMMERCIALLY AVAILABLE PAGE READER SYSTEMS*	Page Reader **Scan-Data 200**	CDC 915	Farrington 3030	IBM 1288	REI RIPCI
400[1] CPS	X	X	X		
800[1] CPS	X	No	No	X	X[4]
Feeder, Scanner and Control	X	X	X	X	X
Central Process. Unit with Mag. Core Memory	X	X[2]	X	X[3]	X
Optional Mag. Core Memory	X	X	X	X[3]	X
On-Line Display	X	No	X	No	No
Fan Fold	X	X	No	No	No
Journal Tape	X	No	No	No	No
Magnetic Tape (7 or 9 and Printer)	X	X	X	X	X
FONTS: Upper Case OCR-A	X	X	X	X	X
FONTS: Upper Case OCR-B	X	No	No	No	X
FONTS: Pica	X	No	No	No	X
FONTS: 1403	X	No	No	No	X
FONTS: Upper and Lower Case OCR-B	X	No	No	No	X
FONTS: Hand-Print	X	No	No	X	X
FONTS: Edit Symbols	X	No	No	No	No
FONTS: Mark Sense	X	X	X	X	X

1. Approximate scan rates.
2. Requires a CDC 1700 as a controller for an economic system configuration.
3. Requires a large-scale computer of the 360 family to which considerable cost and machine time must be allocated.
4. Even though 2400 CPS instantaneous scan rate is quoted, because of system design the scan rate per line cannot exceed 800 CPS and in most applications is considerably less.

* Evaluation source: Scan-Data Product Evaluation Department.

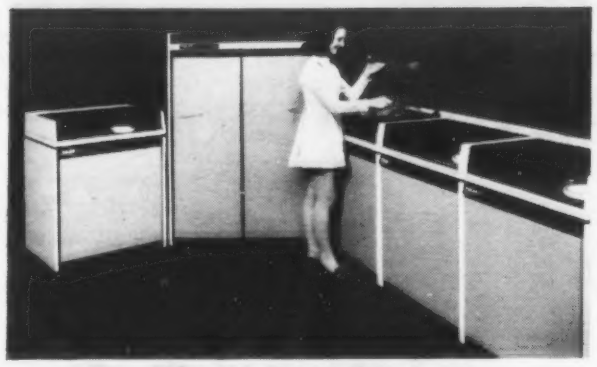
The Scan-Data Model 200: Starts under $4000 monthly rental.

See the model 200 at the SJCC. Scan-Data Corporation, 800 East Main Street, Norristown, Pennsylvania 19401. Telephone (215) 277-0500.

Products on Show at Spring Joint

"Claims His Kindergarten Class Is Considering Chipping Together for One –"

Telex to Show IBM Compatible Tapes



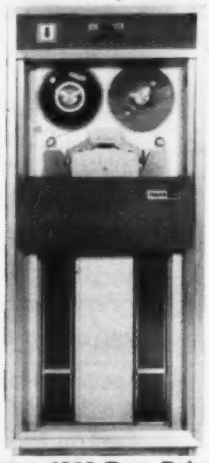
Telex 5314 Disk Storage Drive System.

TULSA, Okla. – The Telex 5314 disk storage drive system will be shown for the first time at the SJCC.

The system on display will be made up of the 5328 file control unit and three 5312 disk storage drives, according to Richard L. Martin, vice-president of the Telex/Midwestern Instruments Group, and president of the Telex Computer Products Division.

The Telex 5314 system, consisting of one through nine 5312 disk drives and the file control unit, is designed to give computer users an alternate to the IBM 2314 facility, with which it is totally compatible, the company said.

The performance of the Telex disk drives in access time, start-up and reliability is said to result in an increased systems through-



Telex 4862 Tape Drive

put.

Among other Telex products to be shown at the SJCC are the 4862 tape drive which features the read/write capability to utilize both 800 bit/in. NRZI and 1600 bit/in. phase encoding on the same plug-in-compatible unit; and the Termicorder, an incremental cassette tape memory for terminals and minicomputers.

Telex computer products will be shown in SJCC booth 1600.

The New CSP-30
is the world's first
and only *wow!*
100-Nanosecond
blow your mind
3-Million-
Instructions-Per-Second
incredible
Digital Computer.

It sells for around
$100,000.

Alas, the best
things in life are
not entirely free.

THE ULTIMATE FANTASY MACHINE

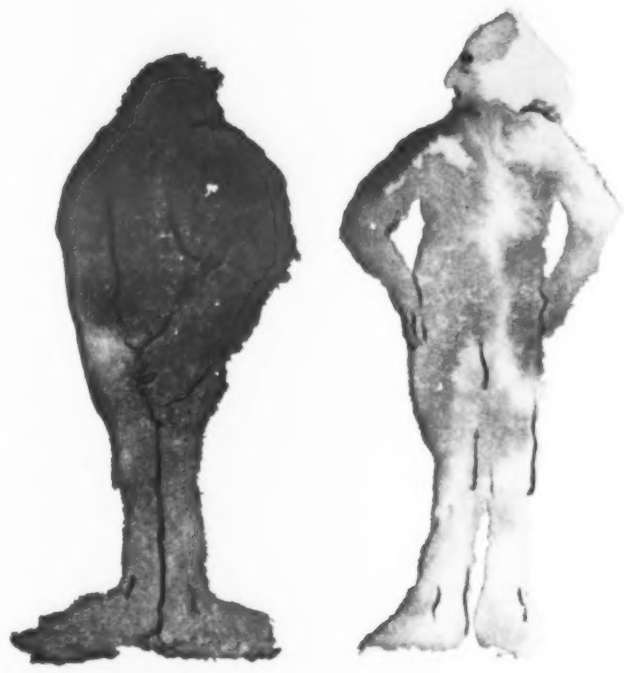
All right! **So here comes another computer (yawn).**

But wait! Did someone say for signal processing? Faster than a speeding bullet? More powerful than...?

It's true. Computer Signal Processors, Inc. has built a digital computer, operating at 3 million instructions per second, with a basic cycle time of 100 nanoseconds, *Right on!*

The base price is $85,000. But yours will probably be around $100,000 *give or take a few thou* depending on the bells and whistles needed to do your particular thing.

For want of a better name, we're calling our fantasy machine CSP-30. Once it's yours, of course, you can call it anything you want. *But Edmund?*



FASTER THAN

A constant tachycardiac fibrillation of high-resolution FFTs coming at you *en* speed 100-nano-second speed freaking *masse!* Not ordinary. No. But *today!*

Which means the CSP-30 can handle continuous real-time Fast Fourier Transforms (the name of the game... perfect!) at bandwidths up to a real 45 kHz. With 20 MHz (8-bit words) block sampling.

MORE POWERFUL THAN

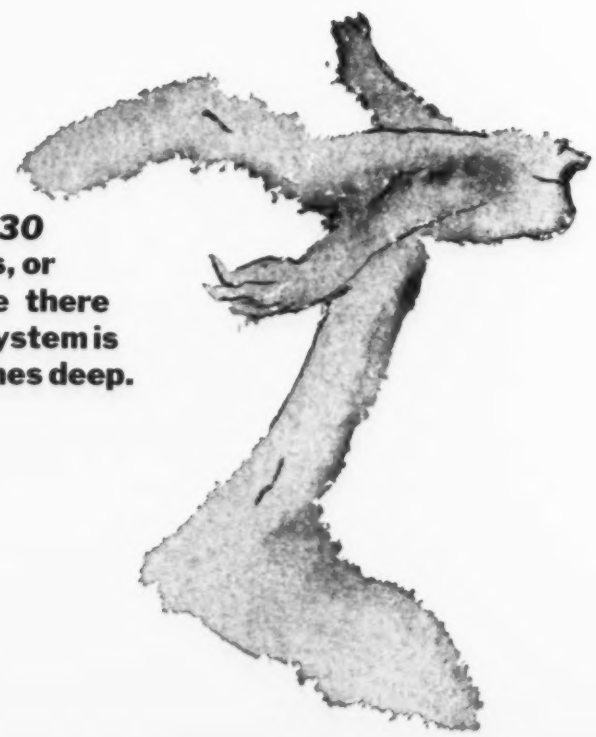
Four on the floor energy blow your mind hood scoop raw bleeding but controlled power, man! That's 10 MHz, and what it means is that since cycle time is a function of power, the CSP-30 is *right there.* Edge City!

THANKS FOR THE MEMORIES

A little here about the combination of two memories. *Gotcha!* Now the integrated circuit memory gives you speed; 512 words, expandable to 2048, basic cycle time 100 nanoseconds. *Of course.* And the core memory gives you economy and storage capacity; 4096 words, expandable to 32,768, full cycle time 900 nanoseconds.

MINICIRCUIT ROAD TO NIRVANA

You dug the speed and you dug the power and you dug the price. Now dig this: *The CSP-30 is portable!* Put it on a train, or a boat, or a bus, or a truck and haul it to and from any field site here there and around the world. Size of the whole basic system is just 68 inches high by 21 inches wide by 27 inches deep. And it weighs just 450 no-cal pounds.

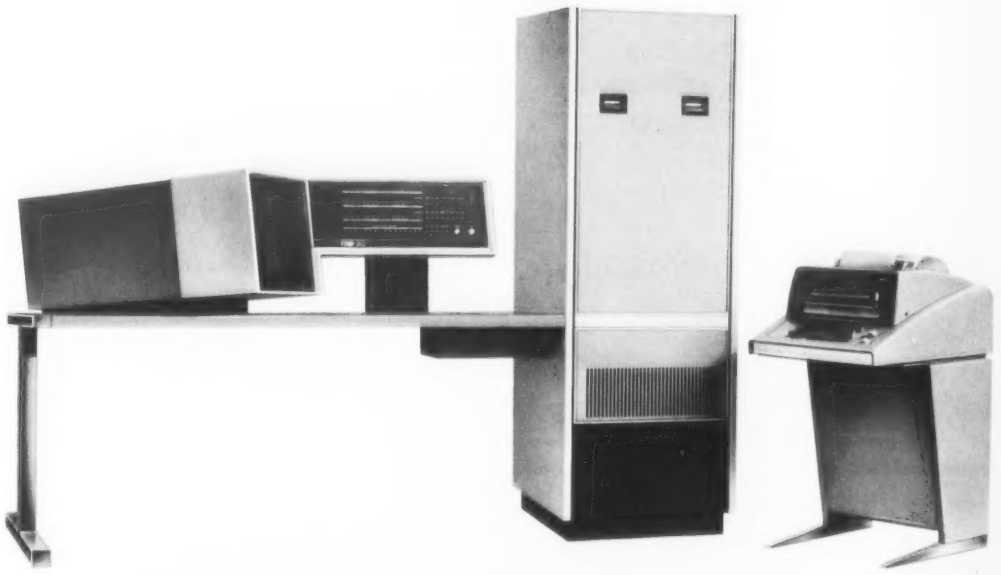


THE SOFTWARE BAG

Our fantasy machine comes with a complete package of magical mystery software including all the conventionally required utility programs such as!::: A loader, symbolic test editor, debugging aid, stand-alone symbolic assembler, Fortran symbolic assembler, and a set of standard diagnostic and maintenance programs. So much for utility.

On to function!

The processing functions accomplished by the CSP-30 (and they are many) are determined completely by software. *And* since each system requires somewhat different detailed handling of the data (it says so in the manual), the software flexibility of the



CSP-30 gives you standard-product economy in spite of system differences. Some of the standard programs and standard program sections available to realize commonly desired functions are:

- **Fast Fourier Transform**
  - **Real-to-Complex and Complex-to-Real FFT**
  - **Zoom FFT**
  - **Cepstrum**
- **Direct Convolution, Cross-Correlation, Auto-Correlation**
- **Recursive Digital Filtering**

MAKING THE SCENE AND DOING YOUR THING

Some people *Believe it!* have already bought a few of our ultimate fantasy machines complete with magical mystery programs and are now happily enjoying euphoric anticipation of unfolding scintillating ultracosmic worlds of scientific endeavor yet to be conquered. *Yes!*

Either you're on the bus or you're not on the bus.

Get on the bus. Fill out the perforated rectangle you observe below and tear off for a mind expanding adventure just over the horizon.

See us at booth #201-202
SJCC – Convention Hall
Atlantic City
May 5, 6, 7

cspi

☐ **Please send me further information on the CSP-30.**

☐ **Please call me to arrange a personal meeting.**

Name _____

Company _____ **Title** _____

Street _____

City _____ **State** _____

Zip _____ **Tel. No.** _____

LAYING IT ON STRAIGHT

THE COMPLETE BASIC CSP-30 consists of:

- Central Processor
- Magnetic Tape Program Entry Device
- Control Panel
- Power Supply
- KSR 35 Teletypewriter (free-standing).

The optional console version of the CSP-30 has a desk-mounted control panel. All versions are provided with complete utility and function software.

Memories

	IC	CORE
Full cycle time (nsec)	100	900
Access time (nsec)	100	350
Half-cycle time (nsec)	–	600
Transfer rate* (millions of 16-bit words/sec)	10	1
Transfer rate* (millions of 8-bit words/sec)	20	2
Basic memory capacity (words)	512	4,096
Expandable to (words)	2,048	32,768
In blocks of (words)	128	4,096

*Direct memory access to or from external devices.

Instructions

Total basic instructions (includes many operational variations) 291
Single-word instructions 212
Double-word instructions 79
Groups: Arithmetic/Logical
Skip
Jump
Shift
Pushdown List & Subroutine Calls
Move/Load/Store
Input/Output

Arithmetic & Logical

Parallel operation
Signed 16-bit operands
Fixed-point binary
2's complement form
Multiply and divide: 2-word result mode
Instructions specify operand sources and result destinations
Instruction operating times:

Add/subtract	200 nsec
Jump	200 nsec
Multiply	1.0 μsec
Divide	3.5 μsec

For instruction modification, add:

Memory reference	100 nsec
Index	100 nsec
Indirect address (per level)	100 nsec

Typical instruction rate: 3 million instructions/sec

Addressing

There are many addressing possibilities, including:
Direct addressing over the full range of IC and Core memories
Indexed addressing
Multi-level indirect addressing

Registers

	Quantity	Length (Bits)	Available*
Accumulator File	32	16	yes
(quantity includes Index Registers)	(14)	16	yes
Operand (A) Register	1	16	yes
Memory Address (IC & Core)	2	16	no
Accumulator File Address	1	5	no
Memory Buffer	1	16	no
Instruction	1	15	no
Program Counter	1	15	no
Intermediate Result Arithmetic (B&C)	2	17	no

*Available to programmer

Input/Output (I/O)

3 parallel, expandable I/O channels for high speed devices or controllers; for data transfer rates over 1 million words/sec
1 I/O channel with 8-device party line controller; includes:
1 address preassigned to magnetic tape program entry
1 address preassigned to I/O Teletypewriter
6 addresses available for assignment
Programmed, single-word I/O data transfers
Programmed sensing of external device status

Priority Interrupts

Initiated externally or by program
Interrupt enable/disable by program
7 interrupt levels are standard:
1 high priority "power threshhold"
1 preassigned to control panel switch
4 available for assignment
1 available to all I/O devices
Additional 6-level ports optionally available.

Physical

Vertical rack
Height 68"
Width 21"
Depth 27"
Total system weight (approx.) – 450 lbs.
Power – 20 amps, 115 VAC ± 10%, 60 Hz
Environment 0°C to 50°C; 20 % to 90% relative humidity; no special air conditioning or sub-flooring required.

Software

Loader
Symbolic text editor
Debugging aid
Stand-alone symbolic assembler
Diagnostic and maintenance programs
Fast Fourier transform programs
Cooley-Tukey (decimation in time)
Sande-Tukey (decimation in frequency)
Radix - 2
Radix - 4
Mixed radix
Real-to-complex FFT
Complex-to-real FFT
Zoom FFT
Complex product
Cepstrum
Direct convolution, cross-correlation, auto-correlation
Recursive digital filtering
First order
Second order
Ensemble average
Amplitude histogram

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Burlington, Mass. 01803

COMPUTER SIGNAL PROCESSORS, INC.
209 Middlesex Turnpike
Burlington, Mass. 01803

Products on Show at Spring Joint

Rixon Modems Can Be Tailored by User

SILVER SPRING, Md. — Rixon Electronics, Inc., an affiliate of United Business Communications Inc., will introduce a new line of modems at the SJCC. These new modems, Series FM-3 and FM-18B, primarily comprise one card modems operating at speeds up to 1,800 bit/sec.

These modems represent a new concept for the OEM market. The FM-3 and FM-18B may be ordered with as many or as few commonly used modem functions as the customer actually requires. The obvious advantage to this unique Rixon concept is that the user pays just for the functions he needs.

These modems can be used in either two- or four-wire systems. EIA RS 232B/C, or optional MIL-STD-188B, or direct logic level interfaces can be provided.

Rixon FM-3 and FM-18B modems are designed to operate over the dial network or may be used in a private network, as the customer chooses. They are compatible with all data access arrangements, automatic call and/or answer.

Full option FM-3s and FM-18Bs are also available in attractive individual housings for desk-top usage.

Rixon will also be exhibiting a new time division multiplexer. The TDX-2 can multiplex up to 88 channels with one unit and speed intermix up to four rates: 300, 150, 134.49, and/or 110 bit/sec, a company spokesman said.

Status and data quality indicators provide rigorous diagnostic capability. The TDC-2 is data transparent and will transmit all combinations of 7- and 8-bit data characters, the company said. The number of channels can be changed by adding or removing channel cards. The TDX-2 is available with or without integral high-speed modems to suit customers' individual requirements.

The TDM is suitable for many time division multiplexing applications.

Optional multipoint and contention capabilities allow users in several cities to share up to 88 channels without the costly process of multiplexing and demultiplexing the bit-stream at intermediate points.

Rixon will be exhibiting in SJCC booths 2103-4.

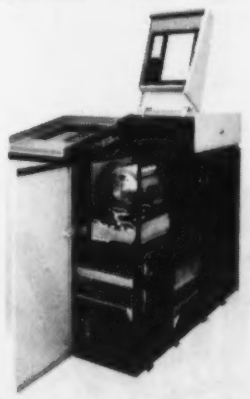
The TDX-2, Rixon's new time-division multiplexer, handles up to 88 lines.

Large Disk Store Keeps 2 Billion Bits On-Line

WOODLAND HILLS, Calif. — Data Products' new direct access Large Disk Store (LDS) will be publically demonstrated for the first time at the SJCC.

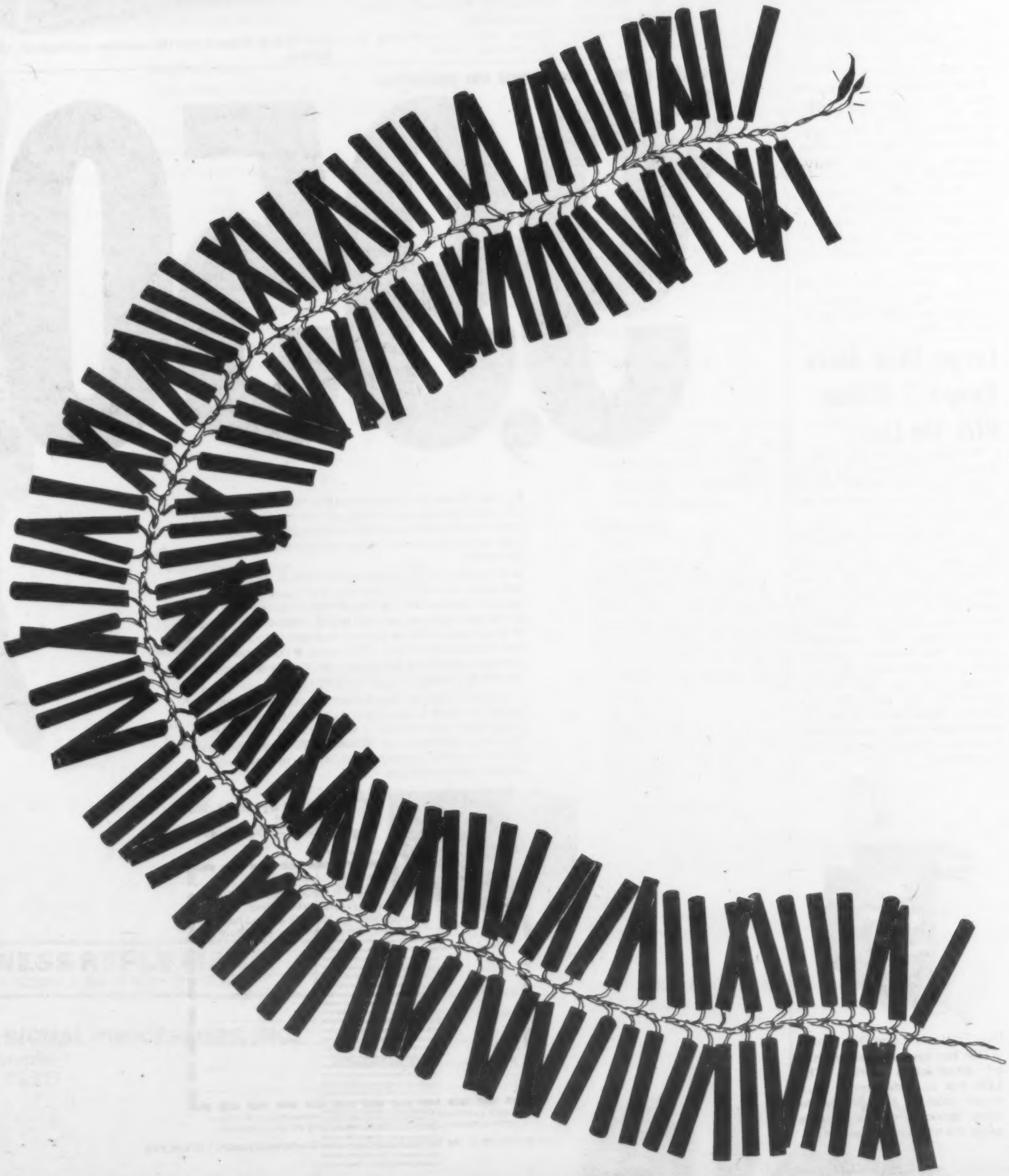
The LDS (Model 6040) is the newest addition to a family of disk files. It provides the mass on-line storage required in today's information systems. The 6040 has a storage capacity of two billion bits and is priced at $60K in large OEM quantities.

Other key features include: voice coil positioners, 55 msec average seek time, dual channel option for use with two processors, fixed head option for immediate access, parallel head read/write option for improved transfer rate.



Data Products' Large Disk Stores (LDS) has over two billion bits of direct-access storage. The LDS has an independent positioner module arrangement to allow servicing of one module while the other is still on line.

RSVP



An unusual product is about to explode on the information scene

The principle is so obvious...and the method is so quick, so simple and so effortless...that you will wonder why no one ever handled computer reports this way before.

We designed the Report Request booklet first. We made it the way people think. The way they talk. Then we designed the system.

Instead of the executive telling *you* what he wants in a special report, he "tells" it to his RSVP booklet. By checking a few boxes and filling in some blanks. It's so easy, he can learn the entire method in an hour or less. And the booklet usually takes 15 minutes or so to complete for each request. In fact, it is easier than telling his secretary or his staff what he wants.

The booklet then comes to your department where a few cards are punched. Rarely more than a dozen. And even this is simplified. A template shows what to punch and where to punch it.

Then to the computer room. The operator hangs a tape or disk, feeds in the cards and the report comes bouncing out. There is never a compile with RSVP. It's ready when you are.

RSVP handles all the details including report title, page numbering, column spacing and headings, editing, control breaks, and decimal point alignment. It even handles data form, field sizes and file merging problems.

It's all very quick. Very simple. Very effortless. For the executive and for you.

RSVP is far ahead of those messy report methods where the inquiry form is a subset of some computer language. Where you end up doing the work anyhow. With RSVP you give the technique to management and forget about it. RSVP won't scare them because they will understand it immediately. And they won't come back to you with questions.

RSVP is great for you in other ways too. It's a true load-and-go method. You can service requests as they come in. Just stack them in the job stream. Turnaround time drops to the point where management will wonder what kind of miracles you are performing.

No programming. No taking people off other jobs. No interrupting work schedules and job flows. Just a smooth, quiet, effective and very simple system.

Technically, RSVP is a very flexible tool. It runs against the file types that COBOL supports. And even some that aren't supported — through the use of more than 30 user exit points for any custom coding you may want to do. There's real power in 150 selection criteria with ability to dynamically arrange any combination of multiply nested "AND" and "OR" groups. It performs normal mathematical operations, even to producing reports entirely of calculated data that doesn't even exist in the file. And RSVP has many more flexibilities to meet a wide variety of special situations.

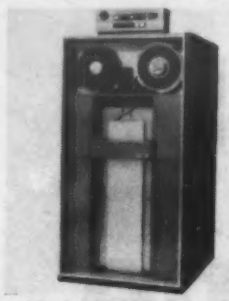
RSVP is a dream to install. You define a file to RSVP only once. An efficient customized program is compiled that services any inquiry against that file. And if a file layout changes? No problem. One RSVP compile does it and you are set to run again on a load-and-go basis.

If you want to get rid of the special report nuisance once and for all, you want to check on RSVP. Do it now. RSVP is already in use in over 20 companies across the nation. Write for more information.

NATIONAL COMPUTING INDUSTRIES
3003 NORTH CENTRAL AVENUE, PHOENIX, ARIZONA 85012
TELEPHONE 602: 264-1394

NCI

Products on Show at Spring Joint



The Model 20290, Bucode Inc.'s star exhibit for the SJCC, can handle either IBM-compatible high-speed cartridges for 1600 bit/in. phase-encoded tape, or standard 7 1/2-10 1/2 in. reels of either 7- or 9-track multidensity tape, according to the company.

Cartridge-Compatible Drive Replaces Hypertape

HAUPPAGE, N.Y. – Bucode Inc. will introduce its Model 20290 Tape Transport, an automatic-loading, high-speed tape drive at SJCC.

The 20290 operates at speeds from 100 to 200 in./sec and at packing densities to 1,600 bit/in. Available with read/write electronics for 800 bit/in. NRZI, 1,600 bit/in. phase-encoded, and dual (800/1600 bit/in.) density recording, and 20290 offers transfer rates to 320 kc.

The 20290 features automatic threading and loading for maximum operator convenience. The 20290, which accepts IBM tape cartridges, as well as industry-compatible reels, loads in 7 seconds. During high-speed rewind, the tape is maintained in the vacuum tanks to maintain constant tape tension, thereby assuring a uniform tape pack on the rewound reel. A full 2,400 ft of tape is rewound in one minute.

Bucode will also announce the availability of 1,600 bit/in. read/write electronics for its Models 2010, 2015 and 2017 family of low-cost low-speed tape transports.

These units, which feature tape speeds of 37.5 in./sec and 8.5 and 10.5-inch reel capacities, will now be available with read/write electronics for 7- or 9-track NRZI format at densities to 800 bit/in., 9-track, 1,600 bit/in. phase encoded format, and 9-track dual (800-1,600 bit/in.) density formats.

Bucode will exhibit in SJCC booth 303.

Remote OCR System Can Process 1,800 Pages/Hour

BRIARCLIFF MANOR, N.Y. – A complete, remote optical character recognition (ROCR) system for installation in any office or in any type of business – ROCR System/70 – is being shown by Cognitronics Corp. at the SJCC.

The System/70 is an extension of Cognitronics' ROCR operations, and utilizes the same components currently employed in the firm's commercial ROCR service centers.

"OCR is now available to the small as well as the large data processing users," said David Shepard, company president. "And now the user has a choice of a remote optical scanner installed on his premises, connected by telephone lines to a Cognitronics service center, or he can have the System/70 in-house. The System/70 can process up to 1,800 documents per hour in-house or from remote scanners," Shepard continued.

The System/70 consists of the standard Cognitronics remote desk-top scanner with automatic feed, a display console and keyboard, and a central processing unit.

Software includes a standard numeric recognition program and the Cognitronics Autoform System which the company claims eliminates batching and eliminates user programming involvement. A magnetic tape output unit is also available.

Cognitronics preprogrammed forms reduce the need for programming each application separately. They permit processing of intermixed documents.

Preprinted coding on the forms controls the scanning, processing and disposition of the data entered on the forms. The user can design special individual programs for each application.

The system features on-site or remote scanning – the system can switch its input from the local or remote scanner, as desired. Multiple standard numeric fonts may be used and may be intermixed at will on the same document. Likewise, machine generated and handprinted numeric characters may be intermixed.

Any unrecognized characters are displayed on the console and can be identified and inserted by the operator by depressing the appropriate character on the keyboard.

The company is exhibiting in SJCC booths 12002-3.

Products on Show at Spring Joint

Minicomputer Has Programmable ROM

SAN DIEGO, Calif. – Meta-4, a minicomputer system that is to be the feature of Digital Scientific Corp.'s SJCC display, features a 90 nsec machine cycle from its read-only memory.

The machine is designed to emulate other machine's instruction sets, such as the IBM 1130 and 1800 systems. Meta-4 can also act as a communications controller, and a message buffer and preprocessor.

With this built-in 'firmware,' the machine can act as a function generator or special-purpose processor for larger computers. Basic core memory-cycle time is 900 nsec with 300 nsec for access. Core can be expanded up to 64K 18-bit words, with multiple overlap in the memory banks.

The ROM can be up to 4K 16-bit words, up to 31 general purpose 16-bit registers can be incorporated, and up to eight 8K-word memory banks can be included as I/O buffers. Four memory ports are provided for each memory bank.

The models 4016/11 and the 4016/18 are, respectively, compatible with the IBM 1130 and the IBM 1800.

The equipment will be on display at SJCC booths 45004-5.

Digital Scientific Corp. is showing its Meta-4 systems at the SJCC. The system can emulate other computers, including the IBM 1130 and 1800 systems.

Bryant to Show Complete Drum Memories Line

WALLED LAKE, Mich. – Mini-size CLC-1 drum memories right up to Series 4000 disk files will fill the Bryant Computer Products' exhibit at this year's SJCC.

Five of the company's product lines will be on display. A 16 million-bit memory drum that offers 17 msec access time leads the memory drum product group. This is the Model 10512 Auto-Lift drum.

The Model 1851024 head-per-track drum with 60 million-bit capacity and 34 msec access time will also be shown as a memory drum. The inexpensive CLC-1, a 1.8 million-bit drum with 8.5 msec access time is specially geared for minicomputers and smaller dedicated machines.

The Series 4000 offers 4.1 billion bits of storage with an average access time of 180 msec.

Bryant is also planning to exhibit its 1100 Disk Storage Drive, a 2311-compatible drive with quicker access times.

The company will be displaying in SJCC booth 500.

Diode Function Generator Leads GCI Exhibits

LOS ANGELES – General Computers, Inc. plans to introduce its new computer controlled diode function generator for analog computer systems at this year's SJCC.

The module sells for $4,150, and is called the Model 300.

The functions are composed of 11 line segments, and any number of generators may be ganged together to produce larger functions or parallel functions.

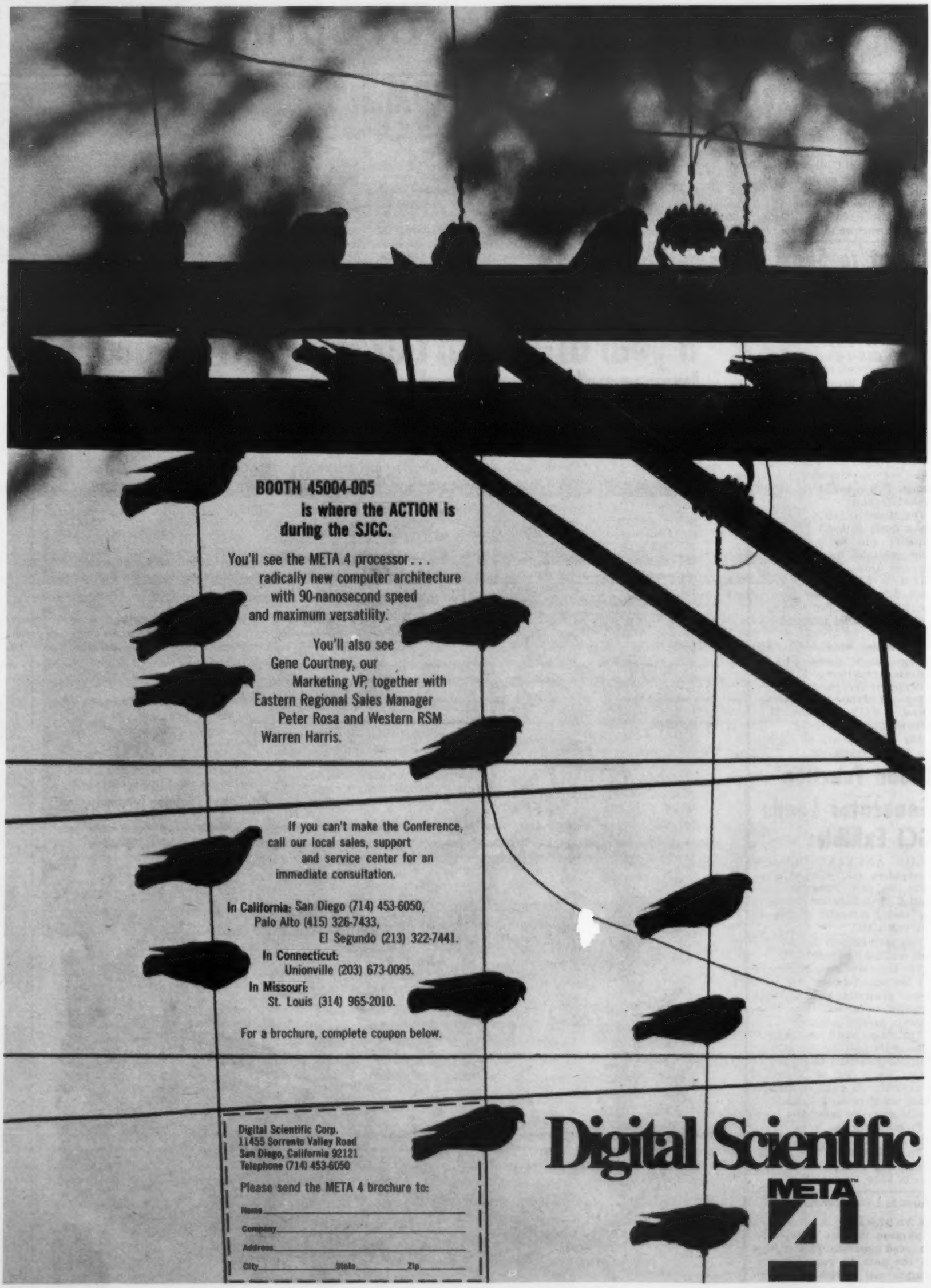
The programmed logic may be altered through the two address lines and 35 data lines used as input. For a rack of 20 generators, only 20 pairs of address lines would be needed and all 20 could share the same data lines.

Programming is achieved in 100 μsec for each generator.

The 300 will be part of the company's display at SJCC booth 1701.

Aussies Like Computers

CANBERRA, Australia – Australian industry is expected to spend more than $250 million in the next 10 years on computers and peripheral equipment. The U.S. is the principal supplierr.



BOOTH 45004-005
is where the ACTION is during the SJCC.

You'll see the META 4 processor . . .
radically new computer architecture
with 90-nanosecond speed
and maximum versatility.

You'll also see
Gene Courtney, our
Marketing VP, together with
Eastern Regional Sales Manager
Peter Rosa and Western RSM
Warren Harris.

If you can't make the Conference,
call our local sales, support
and service center for an
immediate consultation.

In California: San Diego (714) 453-6050,
Palo Alto (415) 326-7433,
El Segundo (213) 322-7441.
In Connecticut:
Unionville (203) 673-0095.
In Missouri:
St. Louis (314) 965-2010.

For a brochure, complete coupon below.

Digital Scientific Corp.
11455 Sorrento Valley Road
San Diego, California 92121
Telephone (714) 453-6050

Please send the META 4 brochure to:

Name_____
Company_____
Address_____
City_____ State_____ Zip_____

Digital Scientific
META™ 4

Products on Show at Spring Joint

Teletype Corp. Magnetic Tape Data Terminal Operates at 2,400 Words/Min

SKOKIE, Ill. – A new family of magnetic tape terminals compatible with its existing equipment will be shown at SJCC by Teletype Corp.

John Auwaerter, company vice-president, said that the device adds high-speed, on-line capability, up to 2,400 word/min, to existing low-speed terminals. AT&T also announced this equipment will be added to its family of Dataspeed data communications services.

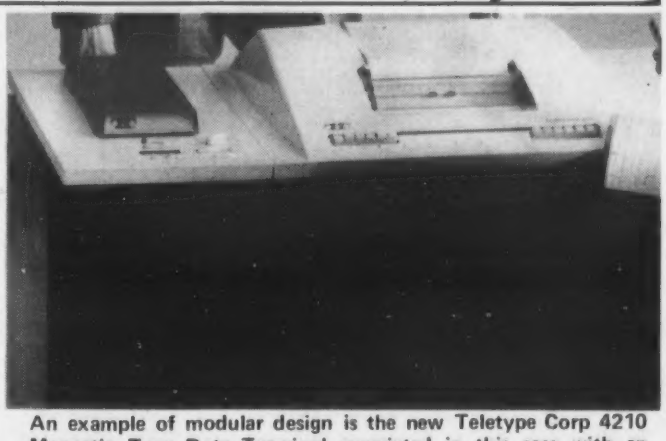
Auwaerter pointed out that the new Teletype Magnetic Tape Data Terminal (MTDT) satisfies market requirements for high-volume storage, easy error correction, economy, and high speed.

The MTDT records data on a compact and interchangeable cartridge about the size of a cigarette pack. One cartridge holds up to 150,000 characters of information. Data can be entered from the keyboard of a Model 33, 35, 37, or Inktronic terminal which use Ascii or on-line from a remote station or computer. A search capability permits an operator to quickly find specific blocks of data stored on the tape.

Teletype feels that in many applications the magnetic tape equipment offers a number of distinct advantages:

- Speed: on-line operation can be as high as 2,400 word/min.
- Compactness: a single MTDT now combines both send and receive capabilities in one package, which formerly required two.
- Improved editing: individual characters may be corrected by simply rewriting the character. The "search" capability provides fast access to locate specific data on the tape.
- Easy handling: the cartridge provides compact high-volume storage, and can be loaded quickly and easily.
- Economy: the reusability of magnetic tape makes it more economical than paper tape in many applications.

The Teletype exhibit will be in SJCC booths 1705-6.



An example of modular design is the new Teletype Corp 4210 Magnetic Tape Data Terminal associated in this case with an Inktronic terminal. The new unit receives or tranmits while the the Inktronic printer monitors data at 1,200 word/min.

Telterm Pages Up to 27 Lines

ATLANTIC CITY – The Telterm line of display terminals is being introduced at the SJCC by Delta Data Systems Corp.

The display is paged in groups of 27 80-character lines. The various lines may be shifted up or down to permit access to the entire 2,500 characters.

The Telterm 1 is intended to replace teletypewriters. The unit has format control with fixed and variable size data fields. Each field can be blinked individually.

The Delta Telterm system of terminals is available from $90/mo to $120/mo, and replaces such terminals as Teletypes, IBM 2265s, and other compatible units.

The Telterm 1 leases for $90/mo. The Telterm 2 is a block mode transmission display. It leases for $100/mo.

The Telterm 2 allows information to be formatted on the screen prior to transmission, and has editing, format control, blink, variable tab positions, margin controls, and the paged memory.

Telterm 3 is compatible with the IBM 2265, with all the existing capabilities of the Telterm 2. The Telterm 3 leases for $120/mo.

The company is also displaying its Delta 1 color display terminal in SJCC booths 1702-4.

Input bound?

Inputing the big, hungry animal is the name of the computer game.

That's why Inforex developed Intelligent Key Entry.™

Inforex feeds hungry CPU's. It does electronically what other forms of data entry do mechanically.

The Inforex system gathers data from eight keyboards into one disc memory unit. Data may be sight or key verified. Built-in logic performs check digits, left-zeros and balance totalling. Jobs are pooled onto 7 or 9-track compatible tape. Optionally, it will operate on-line directly to your central processor.

Keypunch/verifier functions. Starting with the familiar 64-character keyboard, each Inforex keystation performs all keypunch and verifier functions: Automatic check-digit computation. Automatic left zeros. No digit by digit keying is necessary. Electronic skipping and duplicating rather than mechanical. Auxiliary duplication or two additional levels of program control. Automatic + or − signing of fields.

Simultaneous entry and verification. All eight keystations input to one disc memory unit. Each keystation is assigned an area as it enters. Any keystation can access any assigned area at any time. Since each keystation has both sight and key verification capability, one keystation can verify work entered on another and if desired, verification can be done simultaneously with data entry.

Keyboard to tape functions. Inforex automatically pools input from up to eight keystations onto 7 or 9-track compatible tape. One easily entered statement transfers a series of batches. Only one keystation is required to initiate the transfer, and all keystations are functional during transfer. There are no cartridges to handle or identify, no special equipment needed for pooling.

Recallable programs. Each program has four levels of control. Once the program is keyed, it can be stored for future use and recalled by any operator merely by keying its appropriate program name. Up to 128 different program controls can be stored. There's no program card or tape mounting and no repetitive program control keying.

Self-balancing. Zero balancing is an integral part of the Inforex system. Each operator may accumulate a control total during data entry. Edit controls allow rapid correction. Adjustments to the balance total occur automatically during verification.

125-character records. With Inforex Intelligent Key Entry, the record length is variable up to 125 characters.

Full record display. For added accuracy, each keystation displays an entire 125-character record with moving cursor and position counter. The system has a forms capability that allows data entry and verification in a "fill-in-the-blank" fashion. Operator messages for direct interaction with the system along with search and paging of a file are standard.

Attractive office decor. Inforex design innovation doesn't stop with the components. Each Inforex keystation is built into an attractive contemporary walnut and black steel desk designed for operator ease and comfort. And remember, the system is electronic, not mechanical, allowing a quiet, comfortable atmosphere to work in.

Inforex monthly rental cost is $50 per keystation. $560 for control unit (up to 8 keystations). $960 for a complete 8 keystation system, including maintenance.

Inforex, Inc., 21 North Avenue, Burlington, Mass. 01803 or, Inforex AG, Dornacherstrasse 210, Basel, Switzerland.

See us at Booth 5300
Spring Joint Computer Conference

"Inforex it."

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If you're reading someone else's five-day old Computerworld each week, you're defeating our entire purpose in life: to bring you all the news of the computer field as it happens. Not a month later. In fact, we're the only publication that does this . . . the only weekly for the EDP field. But you know a lot about us already. After all, you're reading Computerworld right now.

News fades quickly in the fast-moving computer industry. And a fresh issue of Computerworld delivered directly to you each week will help make you more efficient. All for only 17.3¢ per issue with a one year subscription. Do us both some good. Fill out the coupon below. If you're an employer, attach your Computerworld routing list. We'll see that everyone on the list gets a wrap-up of the news while it's still alive each week.

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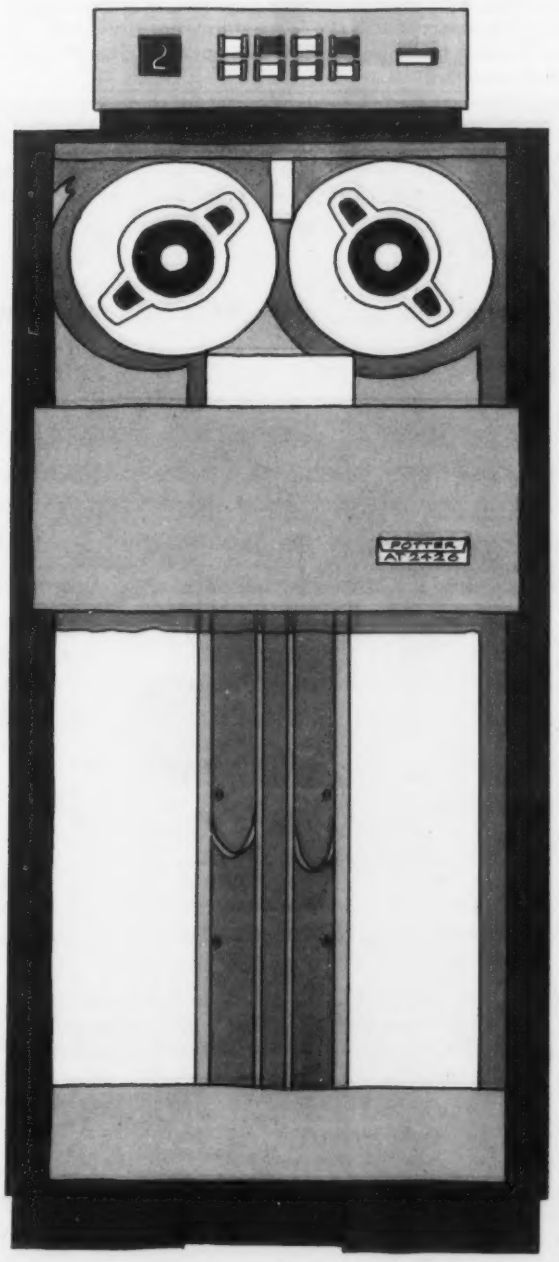
This Potter Tape Unit can increase your S/360 transfer rate up to 300%.



if you have IBM model number:	. . . the Potter AT 2426 gives you this increase in transfer rate:
2401 Mod. 2	300%
2401 Mod. 3	167%
2401 Mod. 5	100%
2401 Mod. 6	33%
2420 Mod. 5	50%

Potter's new AT 2426 can give you a substantial increase in data transfer rate over your present IBM 360 system. With this plug-in compatible Potter tape unit in combination with Potter's new tape control, you can increase your rate (as the chart shows you) from 33% to 300%.

And it can cost you considerably less. No modification of software or space. Just unplug your present IBM unit and plug in Potter.

Potter gives you automatic tape threading too. Put on the reel, push a button, and in just 8 seconds you're ready to go.

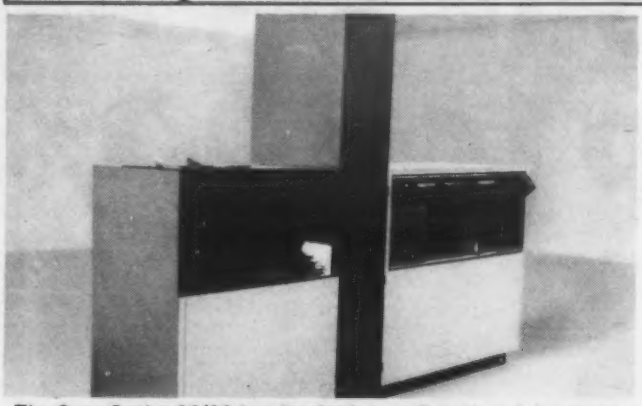
The AT 2426 is the latest addition to Potter's well-known line of single-capstan tape units, thousands of which are in use on IBM systems. As well as reliable products, Potter provides dependable field service. And Potter's 25-year quality record backs it up.

If you can use higher transfer rate, we'd like a few moments with you to tell you about the advantages of switching to Potter. Your accounting department may later refer to them happily as golden moments. Call us.

Potter Instrument Company, Inc., East Bethpage Road, Plainview, N. Y. 11803. Tel. 516-694-9000.

Potter.
A lot more than less expensive.

Products on Show at Spring Joint



The Scan-Optics 20/20 handles both page-format and document-formats. Documents can be either free-format or structured with the firm's macro language. The unit can, optionally, handle hand-printed characters.

$100,000 Optical Character Reader Will Read Mixed-Size Documents Easily

WINDSOR, Conn. – An optical character reader (OCR) with the capability of handling both pages and documents off-line with high throughput will be introduced by Scan-Optics, Inc. at the SJCC.

The new 20/20, with a base price of $100,000, is capable of processing both pages and documents. In fact, as a page reader, the 20/20 has a higher throughput than many readers currently available.

The basic system includes a page and document handler, scanner, control computer, 7- or 9-track magnetic tape transport, and I/O typewriter. The system's modular design allows for the addition of future options.

Also available with the 20/20 is a comprehensive systems software package capable of providing flexibility in a range of applications. Scan-Optics general purpose software is designed to facilitate error checking techniques such as check digits and batch totals.

In a page reading environment with high character density, throughput is principally a function of scanner speed. The scanner had a reading capability of up to 2,000 char/sec. With 1,800 characters per standard page, a speed of greater than 50 pages per minute is achieved.

In turn-around document applications whre the number of characters is normally less than 100, the 20/20 reads up to 500 documents per minute. The system can be used in document reader applications without modification. Its speed and versatility in handling both pages and documents allow it to replace both a page reader and a document reader.

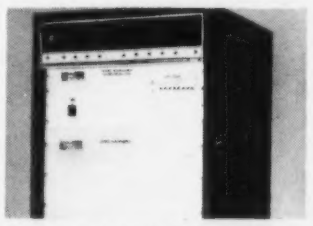
Input formatting is under program control and a maximum of 80 characters per line (10 char/in.) can be handled. There can be a maximum of six lines per inch. Free and fixed formats can be accommodated in the same scanner pass.

The system is also designed to read upper and lower case alphabetics, numerics, punctuation, and symbols. Among the fonts available are: OCR A, 1403, IBM 407E, and self-check 7B and 12E. Options to read other fonts and hand printed numeric data are available.

The company is in SJCC booth 49010.

IDS to Display Disk Controllers

DETROIT – To cope with the need for memory systems for minicomputers, Information Data Systems has two new models of its 5000 disk memory system controllers. One of the controllers is designed to interface with the Interdata Model 3.



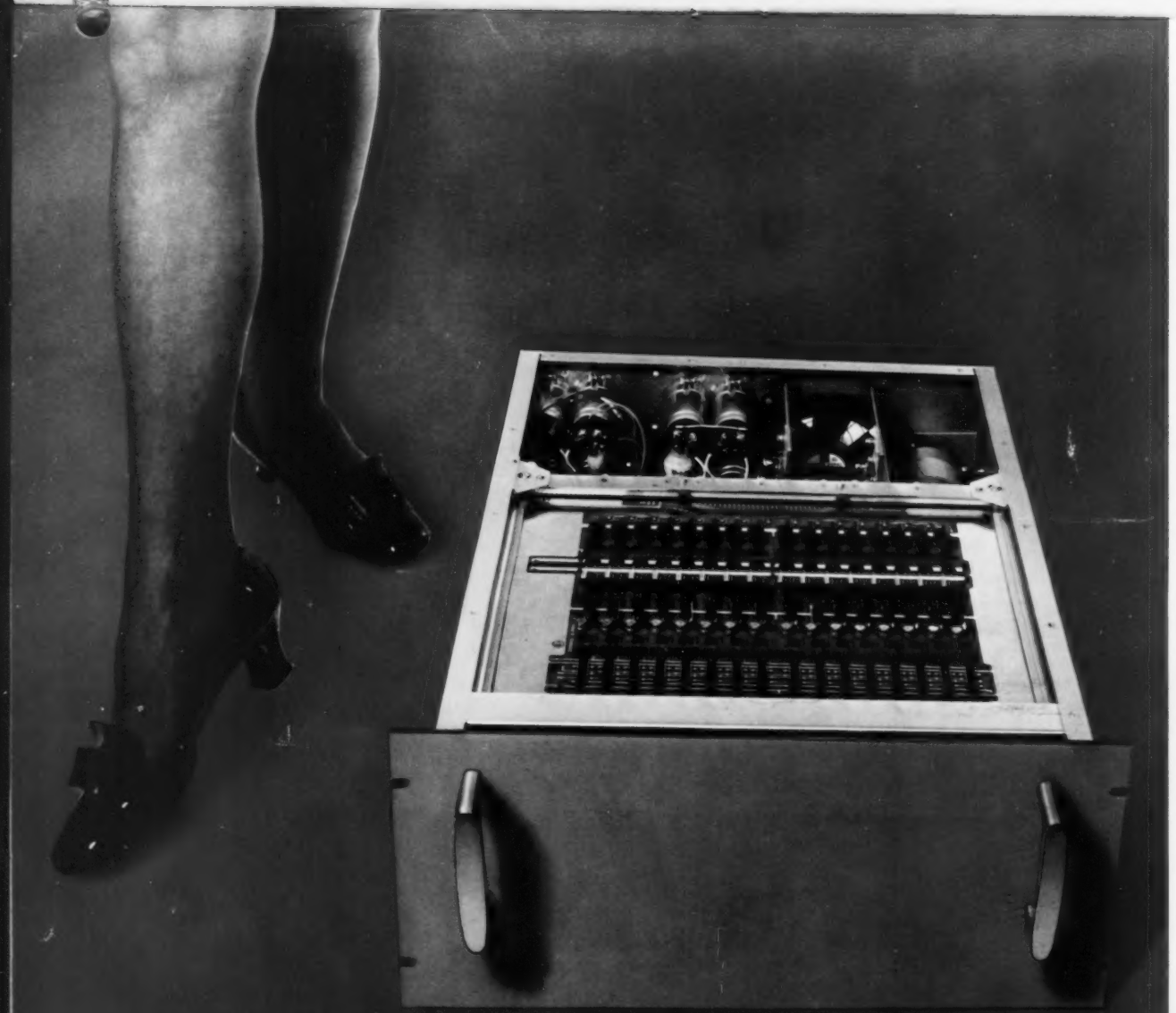
IDS 5000 Controller

Suited for application with these small computers, the controller systems utilize standard 7000 series disk memory units, which offer capacities up to 2.4 million bits with an average access time of 16.5 msec.

The controller for the Interdata machines stores up to 256K 8-bit words expandable in group of 32K words with a word transfer rate of 150K words per second.

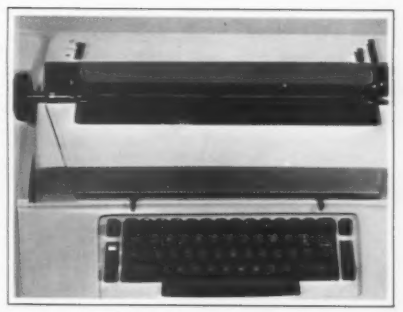
The systems for the Nova computers store up to 128K 16-bit words expandable in groups of 16K words with a word transfer rate of 75K words per second.

The systems will be displayed in SJCC booths 33003-4.



This is the Clary Datacomp 404 computer

These are its most popular control panels



The DATACOMP 404 has no flashing lights or cryptic front-panel markings. That's because it was designed to be used by non-computer-type people—like engineers and business-machine operators and secretaries.

DON'T GET THE WRONG IDEA

It is *not* another lame duck minicomputer. It has a big memory, powerful I/O instructions, a 64-bit main accumulator, two 16-bit index registers and a programmer-selected word length of 16, 32, 48 or 64 bits. Memory capacity is up to 4096 16-bit words in the main frame with options to 65, 536 words in 4096-word increments.

IT SPEAKS DECIMAL FLUENTLY

Decimal add, subtract, and multiply/divide with automatic scaling are standard instruction features. No need for lengthy decimal/binary code conversion software. Your programmer or your operator can think in terms of decimal—not binary numbers.

DIRECT MEMORY ACCESS DOESN'T SLOW IT DOWN

DMA is possible up to 470,000 bytes per second—directly between core and peripheral—without slowing down data processing. Compare this feature with most minicomputers, and you'll find that as their DMA transfer rate approaches specified maximum, data processing stops.

YOU MAY CONNECT UP TO 256 PERIPHERAL DEVICES, THEN SELECTIVELY DISABLE THEM

And without software! Any device on the I/O bus may be assigned an interrupt priority. There may be as many priorities as devices. This means you can design time-share systems around the 404 with a minimum of executive software overhead.

CLARY
DATACOMP
SYSTEMS, INC.

404 JUNIPERO SERRA DRIVE
SAN GABRIEL, CALIFORNIA 91776
TELEPHONE: (213) 283-9485
TELEX: 67-4604

EXECUTIVE TIME-SHARE SOFTWARE FOR TWO TO SIXTEEN USERS

The DATACOMP 404 may be time-shared by two to sixteen users—through keyboard, CRT, or other terminals. For scientific/engineering computations, data communications, remote batch, and a wide range of business/accounting applications (including accounts payable/receivable, payroll, ledger card posting, etc.) For example, in an accounting application where the 404 replaces electro-mechanical business accounting machines, up to sixteen accounting keyboards may be used *simultaneously* with one computer. But regardless of the application, each user may create, load and execute programs from his terminal. A large data base is available for all users by the addition of random-access storage.

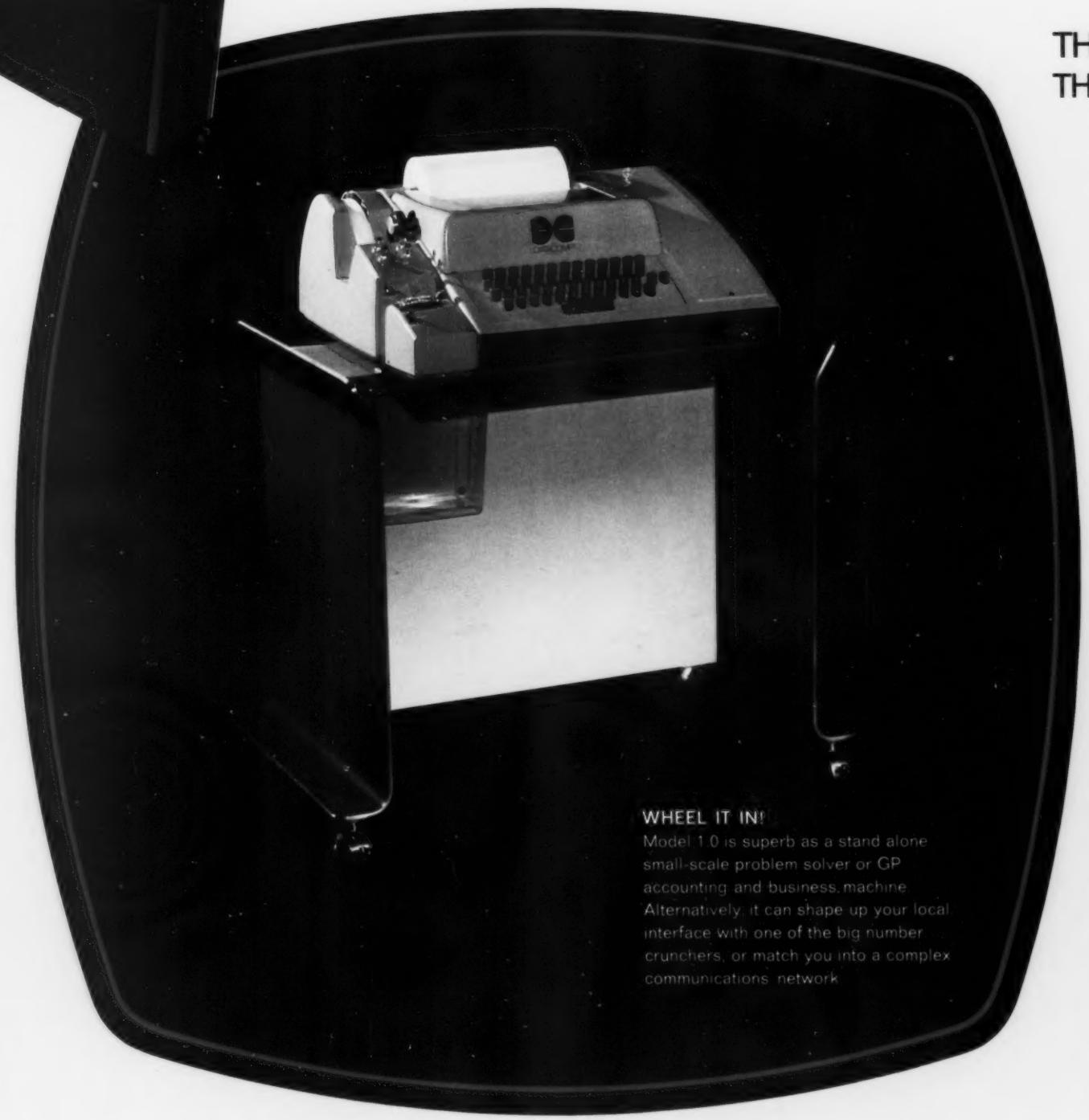
COMPLETE SYSTEMS SOFTWARE AND APPLICATIONS PACKAGES AVAILABLE.

FOR THE COMPLETE STORY ON THE DATACOMP 404, CALL THIS NUMBER TODAY:

213/283-9485. We'll tell you how you can use the DATACOMP 404 as an intelligent terminal or an accounting computer or a sensible "System 3."

See our systems in operation at the SJCC—Booth #28500.

Offering lots of options, Model 3.7 lets you think big with a small processor. Use it independently as a business data processing center; add terminals and peripherals, and it becomes the CPU and control console for an in-house time-sharing system.



WHEEL IT IN!
Model 1.0 is superb as a stand alone small-scale problem solver or GP accounting and business machine. Alternatively, it can shape up your local interface with one of the big number crunchers, or match you into a complex communications network.

PROCESSOR ARCHITECTURE

Serial Arithmetic, Parallel Memory Data Transfer
Decimal Add, Subtract, Multiply and Divide
16-bit by 4K Memory (Expandable to 64K in 4K Increments)
Optional 16-bit by 1024 Word Memory Module
Complete I/O Overlap with Direct Memory Access (DMA)
Variable-length Accumulator (Up to 64 Bits in 16-bit Increments)
Two, 16-bit Index/Accumulator Registers
Powerful Addressing Options: Indirect; Indexed; Relative (to Program Counter); Immediate; Various Combinations.
Hard-wired Loader with "External" Mode Load Control

PERIPHERALS

ASR-33TY Teletype
Selectric I/O Typewriter
MC-10 Magnetic Card Unit
Medium-speed Line Printer
Magnetic Tape Transport
Magnetic Tape (Casette Unit)
Paper Tape Punch and Reader
Random Access Disk
Front Feed Form.Printer
CRT Display
Medium/High Speed Data Modem
Acoustic Coupler

Contact Clary Datacomp now for additional technical details, prices, and delivery.

THE SMALL COMPUTER WITH THE BIG COMPUTER FEATURES

THERE'S A MODEL TO MEET YOUR NEED!
From a stripped-for-action basic processor, to an all-stops-out data processing center, Datacomp 404 models have features you'd expect only in much higher priced machines. Take its decimal arithmetic unit for example: the Datacomp 404 executes a typical scaled 7-digit decimal multiply in less than 1.6 milliseconds! And the 404 keeps its I/O devices and peripherals well fed, too; the 404 memory overlap gives them equal time, eliminating cycle snitching and throughput congestion.

The 404 processor is backed by a supporting cast of stellar software modules . . . including a true single-pass assembler, and a core-resident, time-share exec which takes less than 2K locations (add only 96 words for each active terminal).

Hard to believe? Ask about our incredibly low prices, and demand to see it for yourself at SJCC. Booth 28500, Convention Center.

Model 404. Plug the basic Datacomp 404 right into your system concept. Offers tremendous computing power without frills or fuss.

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Products on Show at Spring Joint

Time-Division Multiplexer Has 64 Lines

PHILADELPHIA – Sonex Corp. is introducing a new time-division I/Onex KDM-100 multiplexer system at its exhibit this year.

The system is designed to permit up to 64 110-baud channels, or other quantities of mixed baud rates, to be transmitted full duplex over a single-voice grade line. The system also features economy for only two channels. The KDM-100 is modularized in 5-1/4 in. high chassis unit for each group of eight channels and on circuit cards for individual channels.

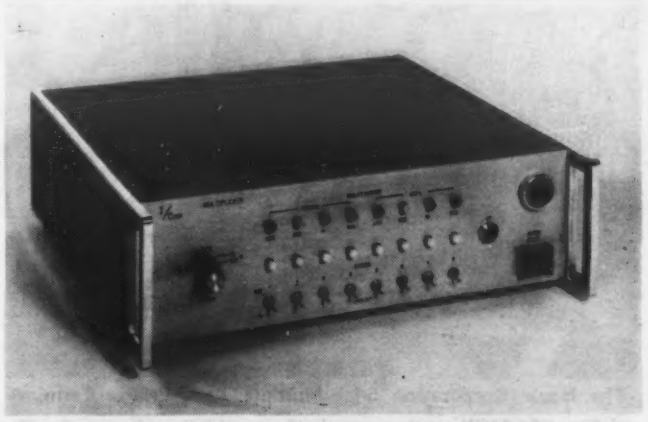
Intermix units are available which permit the dropping off and picking up of channels along any communications link, thus permitting economies usually associated with FM multiplex systems.

The system incorporates bit interleaving, which enables it to be used in echo-plex applications where excessive delay would cause operator difficulties. Typical round trip delay over a thousand mile path is less than 20 msec.

Full system control status, with error-correcting time diversity, is transmitted with each channel as well as system performance parameters in each direction. All data and status parameters are displayed. Controls permit full diagnostic testing of the modem, multiplexer and full-duplex line. Power consumption is only 100 watts per eight channels.

Price for a complete 8-channel system is less than $10,000 and delivery is stock to 45 days.

A complete system will be in operation between a time-shared computer in Philadelphia and SJCC booth 50007.



The Sonex time-division multiplexor system, KDM-100, will be the new introduction from this firm for the SJCC.

Products on Show at Spring Joint

The Novar Corporation 5-51 Multiple Tape Printer Terminal provides one answer for coordinating order processing, power typing and computer entry, according to William C. Bennett, company president.

Data Entry System Coordinates Orders

MOUNTAIN VIEW, Calif. – Novar Corp. is announcing a new system, the Novar 5-51, that combines computer entry and the preparation of error-free correspondence at the SJCC.

According to William C. Bennett, company president, the new 5-51 is different from the standard magnetic tape typewriter system. Designated the 5-51 Multiple Tape Printer Terminal, it provides an answer for coordinating order processing, power typing and computer entry, Bennett said.

"The 5-51," Bennett said, "has greater flexibility, more speed and a lower price tag than the standard magnetic tape typewriter. And the system incorporates all its functions in a desk top unit, providing not only error-free copy, but computer entry capability as well."

With the 5-51, it is possible for an operator to prepare typed information rapidly and store a copy on magnetic tape as it is being prepared. This "rough" draft is then played back from the magnetic tape and printed out for verification.

Additions, deletions, and corrections can be made from the keyboard during this playback through an operator-oriented system for data editing.

The changes and those portions of the original recording that do not require alteration are automatically transcribed onto a second "clean tape" for later transmission to a computer or for playback at the local terminal. It is possible to train an operator in less than one hour to prepare perfect copy, the company said.

One of the uses of the 5-51 is to store input and print formats on one tape cartridge, and information to be prepared for later transmission to a computer on the second cartridge.

The information contained on the first cartridge correctly positions the forms in the printer and automatically prints out fixed informaton. The operator adds only the variable data to complete the operation, recording all on the second tape for later transmission.

Another application of the 5-51 which should have appeal for time-sharing users is the storing of computer programs on one tape and variable data to be executed on the second tape. Automatic processing takes place by first loading the program into the user's time-sharing computer from the first tape, followed by the entry of the variable information from the second tape. Processing can take place immediately and the computer response will be printed out at the terminal.

The 5-51 provides a low cost, but powerful typing system.

When used in this manner, up to 48,000 characters of information can be stored on each tape cartridge for later printout at the terminal. The use of the 5-51 greatly expands the power of Administrative Terminal Systems (ATS) by allowing the operator to perform normal editing of typos and insertion of simple corrections from the keyboard, and by using the power of the ATS text editing system for insertion of major corrections, reordering of data, insertion of key words and automatic justification.

Another capability of the 5-51 allows one tape to be copied on one or more additional readers at speeds up to 240 char/sec for tape duplication.

The company will be in SJCC booths 26007-8.

Program Bypasses Keypunch

LEONIA, N.J. – A universal typewriter program that enables computers to directly accept alphanumeric data prepared on standard office typewriters has been developed by CompuScan, Inc.

The program bypasses error-prone keypunching by personnel unfamiliar with the original data, the company claimed. "The charge is as low as 1.1 cent per line," said a company spokesman.

CompuScan is at 125 Fort Lee Road.

Is Qantel a Data Collector Concentrator Store and Forward Device Editor-Verifier Stand Alone Computer or Network Terminal?

Yes!

Qantel V speaks your language... ASCII... EDCDIC, you name it! Over dial-up or lease voice grade lines. Qantel V has 3 μs 8K core memory... byte oriented... up to 8 buffered Input/output channels... hardware interrupt... indirect addressing. 10 KC magnetic tape drives... 800 bpi... paper tape read and punch. Operating systems start at $340 per month. **Call us now.**

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New York: Two Penn Plaza, New York, NY 10001 (212) 239-8340

Products on Show at Spring Joint

Xerox Demonstrates Its Copyflo Computer Output Microfilm Printer

ROCHESTER, N.Y. – Xerox Corp. is again demonstrating its computer-output microfilm (COM) printer, the Copyflo Continous Printer 1-40, at the SJCC.

The printer produces hard copy directly from computer-output microfilm.

Two Xerox Microprinters, for printing the image of COM at remote locations, will also be shown.

The company's newest duplicator, the 7000 Reducation Duplicator, reduces computer output to standard 8 1/2 in. by 11 in. pages in a single operation. The unit, which will also be on display, produces copies at the rate of 60/min.

A Xerox subsidiary, Cheshire, will share the company's booth to display its label printer system.

The exhibit will be in SJCC booth 2800.

Mercutronic Coding Keyboard Ready For Numeric, Alphabetic Applications

ALEXANDRIA, Va. – Mechanical Enterprises, Inc. says it will display several versions of its new Mercutronic coding keyboard. The actual production units which will be available for examination and for demonstration will range from simple 10-key units for electronic calculators to complex keyboards with more than 50 keys for computer terminal applications.

The award-winning Mercutronic coding keyboard design consists of a custom keyboard with no printed circuit board or soldered connections. The plastic key module contains all encoding diodes and a mercury switching element to provide reliable no-bounce output.

Positive contact is ensured by use of non-oxidizing components under constant spring tension. A five-channel aluminum extrusion of any desired length holds the individual switch modules and the continuous flat, 11-wire cable that carries the signals. Key modules are simply snapped into the channels and permanent contact is established.

The Mercutronic Coding Keyboard that is pictured contains 52 switch modules (ASCII Code), eight control keys, and two options (Strobe Signal Inhibit and Shift System). A keyboard of this configuration costs $247.50 for one, down to $99 in production quantities. A 10-key numeric open-frame keyboard, BCD Code, costs $37.50 for one down to $15 for production runs.

The Mercutronic will be displayed at SJCC booth 49007.

System Handles Inquiries

NEW YORK – A central inquiry file system (CIF), designed to handle up to 5,000 inquiries a day with a 72-hr turnaround, has been introduced by the Compu-Mail Division of PDA Systems, Inc.

PDA Systems, Inc. is at 12 E. 86th St.

'Ruggednova' Minis to Use Numeric Display

CUPERTINO, Calif. – Rolm Corp. is introducing solid-state numeric readout indicators for its "ruggednova" line of computers. The SJCC exhibit will demonstrate the use of this numeric indicator panel for octal readout or both address and data information.

Hewlett-Packard built the readout devices, which have an expected life in excess of 100,000 hours, according to the company.

The display module has a 5 by 7 dot-matrix format that creates a quarter inch character. The Model 1601/05 is available from the company at $2,000. It will be on display at SJCC booths 33007-8.

Rolm 1601 Minicomputer

Shoppers guide to keyboard data entry systems.

We are confident enough in our KeyTran data entry system to invite comparison. Stop by our booth at the Spring Joint and we'll give you a pocket folder designed for comparison shoppers. No strings attached. Only a pen for making notes.

Our confidence is based on these points. The system is controlled by a 750-nanosecond SYSTEMS 810B computer. It was designed for high reliability in real-time applications, and it comes with complete systems and application software.

Since we make it ourselves we pay less for it. And so do you. And then we maintain it with a national service force located in every major city.

KeyTran is a computer-based data entry system that can handle up to 398 characters. It collects, searches, edits, formats, analyzes, verifies and corrects data automatically from up to 48 terminals simultaneously. All under the control of a single supervisor.

But the proof is in the comparison.

System KeyTran

Company Systems Engineering Laboratories

YES	NO	
☒	☐	Are the system and its computer made by the same company?
☒	☐	Does the manufacturer maintain a national service organization?
☒	☐	Will the system store on a disc file and transfer to tape without interrupting data entry?
☒	☐	Will it analyze operator performance?
☒	☐	Does it have automatic batch balancing of up to five fields?
☒	☐	Does it have a variable record length up to 398 characters?
☒	☐	Does it have an unlimited number of formats?
☒	☐	Is the computer made by a real-time company to handle real-time jobs?
☒	☐	Does the system have a search facility with insert capability?
☒	☐	Does it have field display?
☒	☐	Can the keyboard terminals be used for verification as well as entry?
☒	☐	Is the system well designed from the standpoint of operator convenience and comfort?
☒	☐	Can the system's computer be used for peripheral functions?
☒	☐	Does the system allow retention of jobs on disc, after they have been transferred to tape, for updating and correcting data files?

System_____

Company_____

YES	NO	
☐	☐	Are the system and its computer made by the same company?
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☐	☐	Can the system's computer be used for peripheral functions?
☐	☐	Does the system allow retention of jobs on disc, after they have been transferred to tape, for updating and correcting data files?

Pick one up at Booth 8600.

SYSTEMS
ENGINEERING LABORATORIES

PDP-8/L is the best small computer ever made. Bar none.

More than 6,000 of these, and predecessors in the PDP-8 family, are already installed.

We have the peripherals that go with them. The software libraries are bulging. More experience has been accumulated, more application data gathered, more service records, more of everything—than has ever been accumulated, exchanged, applied to any other small computer in history.

And more PDP-8/L's have been installed in other people's equipment than any other computer. By far.

12 bits. 4K core memory, expandable. Teletype. $8,500. Quantity discounts. Off the shelf delivery.

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Digital Equipment Corporation
Maynard, Mass.

PDP-11 is the best small computer ever made. Bar none.

PDP-11 is more than a new computer. It is a new idea in computers. Its secret is an architecture which makes it more powerful than any other 16-bit computer.

Everything is attached to a single high speed, asynchronous UNIBUS.® The processor, the memory, the peripherals—everything.

And because of this, peripheral registers are accessible as part of memory. Peripherals talk to peripherals without bothering the central processor.

But that's not all. Interrupts are multi-level, automatic. There are eight MSI general-purpose registers. Fast single and double operand addressing. An instruction set so powerful that you'd think it belongs to a giant computer.

And PDP-11 handles bits, bytes or words with ease.

16 bits, 4K core memory expandable to 131K. Teletype. $10,800. Quantity discounts. Thirty to sixty day delivery.

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COMPUTERS · MODULES

**Digital Equipment Corporation
Maynard, Mass.**

Products on Show at Spring Joint

SPC-16 Minicomputer Acts as Center Of Industrial Automation Complex

ORANGE, Calif. – General Automation, Inc. will introduce the new SPC-16 computer at the 1970 SJCC here.

The SPC-16 will be interfaced with GA equipment representing the company's entire family of compatible computer products. This configuration will form a distributed computer concept typical of an industrial automation installation. In addition to the SPC-16, the GA DCC exhibit will include the System 18/30 supervisory system, the SPC-12 minicomputer, and GA plug-in minicontrollers.

The compact SPC-16 offers unique combination of features to reduce programming time, improve program management, extend memory utility and increases computer performance and flexibility, the company said.

Designed as a dedicated automation computer for manufacturing and production environments, the SPC-16 also processes laboratory and scientific data acquisition, data communications, and process and control automation projects.

The basic system, including support software, is priced at about $10,000.

The system provides both on-line and off-line operation, with up to 64 hardware priority interrupts. It incorporates interchangeable read-only and read/write memories, as well as 16 general-purpose registers.

A set of base-relative/program-relative instructions enables users to take advantage of both memory tapes.

Basic 4K core memory is field expandable to 32K in 4K increments, with 960 nsec access time for the entire 32K memory. ROM, with 480 nsec access time, may be expanded in 512, 1024, or 2048 word increments.

A 16-fold expansion of memory effectiveness can be obtained via the SPC-16's powerful instruction set, which can individually address bits to 512K, bytes to 65K, and words to 32K. Discrete bits, bytes, and complete words can be stored or operated upon with a single command, a feature valuable in communications and manufacturing operations.

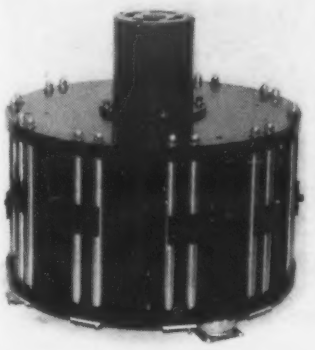
The exhibit will also include:

- The System 18/30 automatic control system, capable of supervising smaller systems such as the SPC-16 and SPC-12. The 18/30 processes over 400,000 instructions per second, with 960-nsec memory available to 32K.
- The SPC-12 minicomputer, optimized for real-time operation. The SPC-12 can execute over 230,000 stored-program instructions per second and has a basic 4K by 8-bit word memory expandable to 16K.
- A family of pre-engineered, plug-in minicontrollers, which provide system flexibility in interfacing with mechanisms, devices, instruments, sensors, data sets, teletypewriters, and other peripherals.

Software support packages are supplied with every system. A wide selection of off-the-shelf software is available from the software library, including "Automate" packages for easy development of special-purpose programs.

Service capabilities for automation are offered by the Automation Sciences Division, from initial system analysis and consultation through programming, systems engineering, and on-site checkout. These services are locally available through Technical Application Centers established across the U.S. and in Europe. Installation and maintenance services are available from 110 service depots in major cities.

The company will be in SJCC booths 4401-4.



Model B-256 Drum Memory

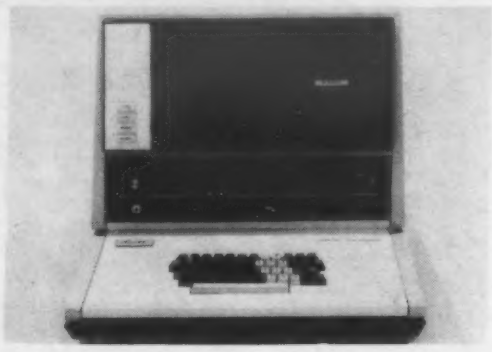
IER B-256 Stores 8.5 Million Bits

ARLINGTON, Va. – A new drum memory system from IER Corp. will be shown for the first time at the SJCC.

The Model B-256 drum memory has a storage capacity of 8.5 million bits. The system has a head-retraction unit that avoids most potential head crashes. The retraction sensors detect the clearance between the heads and the moving drum surface.

The Model 512, not to be shown, has a storage capacity of 19-million bits. Both units are expandable from 1-million bits.

Products on Show at Spring Joint



The Friden Model 4301 Magnetic Data Recorder.

Singer Vies for Data Entry Market

NEW YORK – Friden Division of the Singer Co. is challenging Mohawk, Honeywell, and IBM for a significant place in the magnetic tape data entry market with the introduction of its new 4300 magnetic data recording system (MDRS) at the SJCC.

"We intend to be one of the leaders in this segment of the data origination market by 1971," asserted Division President R.J. Campbell. "The 4300 provides an economical and efficient means of keyboarding data for direct input to third-generation data processors."

"Computer peripherals in general now account for about 65% of a user's total systems cost," he said, "and in business-oriented computer systems the percentage is higher and growing more rapidly than the computer industry as a whole."

The 4300 system enables any user of conventional magnetic tape drives to record data directly from a keyboard, nearly identical to the traditional keypunch device, at speeds substantially faster than the keypunch/verifier operation, the company said.

Purchase price on the Friden Division's 4300 MDRS units begins at $4,500 and the devices are available on a one-, two-, or three-year lease.

The 4300 will be displayed in SJCC booth 35002.

Dynemac 90 Can Replace IBM 2703

GLEN ROCK, N.J. – Users now have an alternative to the IBM 2703 Communications Controller in the Dynemacc 90 by Dynelec Systems Corp.

To be shown for the first time at the SJCC, the Dynemacc 90 can handle up to 220 ports for either local or remote low-speed lines. In one configuration, saturating the ability to multiplex on the 48 full-duplex ports, 1,024 lines may be accommodated.

Mixed baud rates from 45.5 to 300 are possible for each port, the company said. Twelve of the high-speed ports can be multipexed to handle 64 low-speed lines each, totalling 768 low-speed lines. The other 36 ports, in this configuration, operate at from 1,200 to 4,800 baud.

The Dynemacc can be operated over an S/360 multiplexor channel to emulate standard peripheral controllers like the 2703. It can also be run on a selector channel and buffer complete messages internally.

The Dynemacc is a complete system, in larger configuration, with its own software and macro-language to control message processing.

In addition to the Dynemacc 90, Dynelec is offering the Dynecom 70W asynchronous time-division multiplexor.

The 70W is used as part of the system with the 90, when multiplexing low-speed lines onto high-speed lines.

It can process up to 64 low-speed lines onto a single 2,400 baud line (voice-grade.) Four different low speeds may be accommodated on a single unit. Asynchronous and synchronous data may be mixed on different low-speed devices. Codes varying from 7.4 to 11 bit/char are supported including Ebcdic, Ascii, Usascii, BCD, Baudot, and EBCD. Other codes are available on request.

Dynelec will be exhibiting in SJCC booth DD.

PEP-400 Video/Graphic Storage Terminal Provides Broad Scope

NORTH BRUNSWICK, N.J. – Princeton Electronic Products, Inc. has developed Lithocon, an electrical-to-electrical silicon storage tube and the PEP-400, a revolutionary scan converter and video/graphic storage terminal.

The PEP-400 Video/Graphic Storage Terminal can be operated in a wide range of video, x-y, and scan conversion modes and is supplied with either an 800- or 1,200-TV line resolution Lithocon tube.

The input can be either video or analog x-y positioning with a 525/1029 line raster scan readout compatible with standard CRT monitors. Electronic zoom, selective erase, automatic erase, and read/write cycles are included with the unit. The terminal is used in graphic applications for storage of random input of x-y information which may also be selectively written and erased.

Delivery is six weeks after receipt of an order. Single unit costs are $3,750 and $4,250 for the 800 and 1200 TV line terminals respectively. Prices for production quantities are negotiable.

The storage tube has general application for CRT displays especially, where graphics and gray scale are required, where remote terminal operation is desired, and where in such usage it becomes desirable to eliminate continuous on line operation of the terminal with the CPU.

The company will be in SJCC booths 47003-4.

Products on Show at Spring Joint

MDR-8000 Interfaces to Keypunch

PHOENIX, Ariz. – Motorola Instrumentation and Control Inc. will introduce at the SJCC a new device that interfaces the firm's MDR-8000 document reader with the IBM 029 keypunch.

The automation division also will exhibit new models of its MTP-series high-speed electronic teleprinters in operating data communication terminals.

The document reader to keypunch interface to be introduced provides transfer of penciled mark-sense data directly to punched cards for entering the mark sense data directly into IBM mainframe computers.

The unit plugs into the keypunch without alteration of keypunch wiring and also can be mounted inside the keypunch, the company said. A portable remote control package with two rocker switches and an error light mounts on the 029 console. The control package provides manual or automatic MDR reader card feed, error reset, and an error alarm light.

Data transfer is parallel by bit and serial by character from the MDR-8000 to the IBM 029 at the rate of 10 char/sec. Data can be entered from the keypunch keyboard or from the MDR document reader onto the same cards. Auto duplication, auto skip, and data entry functions are provided.

The translator will be shown in booth BB along with the data terminal configurations and the MTP-series high-speed teleprinters.

The Motorola document reader to 029 Coupler permits pencil-marked data to be transferred automatically from mark-read documents to 029 keypunch. The unit installs in the rear of the 029 keypunch. It plugs in with no wiring changes necessary, according to Motorola.

Irascope Uses Full IBM Font

ATLANTIC CITY – A specialized version of the Irascope CRT Data Base Display Terminal will be introduced at SJCC by Spiras Systems, Inc.

The new Irascope Model DBEC 1000 U/L features IBM font 72 upper/lower case characters, IBM Selectric type keyboard, and interface capability with Spiras, DEC, and IBM computers, and local and/or remote editing capabilities.

Other Irascope features include 1,000 high-resolution, flicker-free characters in a 2,000-character field and bonded safety faceplate etched for minimum glare.

Over 200 orders have already been placed for the new specialized model which is priced in the $7,000-$8,000 range on a single-unit basis. Full details are available during SJCC at Spiras: Booths 118-119.

The Ards 100A is a complete remote graphics system for about $10,000.

Ards Now Packaged in Systems

WALTHAM, Mass. – Computer Displays, Inc., the developer of the Ards graphic display terminal, it now packaging the terminal with other equipment as systems. Two forms of these systems are to be on display at the SJCC.

The basic Ards system includes the Ards terminal, at a base price of $7,950, plus a graphics controller and modem coupler. The 100A can operate at 1,200 baud over voice-grade telephone lines and at 50,000 baud when directly connected to the computer. The 100A sells for about $10,000.

A digital cassette tape recorder can also be connected to the Ards system, The cassette runs at 1,200 baud, and can act as a 'hard-copy' storage device for the display. The tape can be ready one 'page' at a time.

Computer Displays is also marketing a hard-copy camera, made by Polaroid, for photographing the screen. The camera sells for $274. An 1130 interface, for $3,300 allows the Ards to be coupled directly into an IBM 1130.

Computer Displays, Inc. will be exhibiting in SJCC booths 25003-5.

Products on Show at Spring Joint

Key-Edit Will Support Up To 16 Terminals

TORONTO, Ont. – A four-station version of its 16-station key entry system will star at Consolidated Computer Services' exhibit at the SJCC.

The system, called Key-Edit, can be operated with minimal training. The system eliminates multiple tape drives, according to the company. All editing and verifying commands are available, with multiple programs.

The Key-Edit will be on display at SJCC booths 46005-7.

Consolidated Computer Services will be exhibiting a four-station version of its Key-Edit system. The Key-Edit offers 16-station pooling for data entry.

'Pay-as-You-Microfilm' Plan Benefits Small User

ROCHESTER, N.Y. – A new pay-as-you-microfilm lease meter plan, introduced by Eastman Kodak Co., allows computer users to exploit the speed and service advantages of the Kodak KOM-90 microfilmer immediately – without waiting for further growth.

Minimum lease period has been shortened to one year. The lease meter plan charges users only for the time they actually use – as measured by a meter inside the microfilmer.

This means that many service bureaus, government organizations, financial firms, commercial and industrial organizations can now justify the cost of a KOM-90 of their own, even though they may use it less than one hour a day.

The new plan is especially designed to benefit small users – starting small, and then growing with the customers.

Monthly base rates now run as low as $2,200 on a five year lease; $2,425 for 3 years, or $2,650 for one year.

Users pay nothing beyond these base rates for their first 20 hours of monthly usage. Additional hours are charged at a declining rate; $7 per hour from 20.1 to 60 hours, to $6 per hour over 180 hours. Kodak pays transportation and associated insurance charges to the customer's location.

Lease period for the Kodak KOM-90 Tape Transport has also been reduced to one year.

The KOM-90 and other Kodak microimage products will be displayed at the SJCC.

Sanders to Introduce Mini Display System

NASHUA, N.H. – Sanders Associates is planning to introduce a complete new display-oriented minicomputer system at the SJCC.

The system will consist of Sanders' displays, a minicomputer central processor, mass storage, a communications network, and several related peripherals, the company said.

The system is intended to handle large-scale paperwork problems and massive source data entry procedures. An example of the type of problem for which the new System 7000 was designed is the regional telephone company offices.

The System 7000 will be on display in SJCC booth 2900.

PDC 4800B Equalizes 4,800 Baud Signals Automatically

ROCKVILLE, Md. – A 4,800 baud data set that uses Series 3003-C2 conditioned lines and offers automatic equalization of line signals will be Penril Data Communications' entry in the SJCC.

The PDC 4800B data set is being shown for the first time. It interfaces with the EIA RS 232C for synchronous 4,800 bit/sec transmission.

The standard version is priced at $3,500 in small quantities. An optional four-knob manual equalizer is also available, with appropriate cost reductions in the data set. The unit can be rack-mounted.

Penril will exhibit in SJCC booth 24014.

Announcing Heurecorder

the most important
key-to-tape development yet

M600 Portable Data Recorder

The go-anywhere fully compatible key-to-tape device that transmits data direct to your computer or teletype from remote locations

Meet the low-cost Heurecorder. The lightweight portable key-to-tape device that collects and records error-free data right at the source. In the field. Supermarkets. Warehouses. Utility meters. Open storage yards. Forests. Anywhere. And after it verifies and records the source data on compatible IBM tape, Heurecorder transmits the error-free data direct to your computer. Or to your teletype in USASCII code. From any telephone. Touchtone or dial. Located anywhere. All over the world. Amazing.

heuristic concepts inc

115 WOODLAND AVENUE, WESTWOOD, N.J. 07675 / (201) 666-2100

Products on Show at Spring Joint

United Telecontrol Shows 1K Single-Card System at $500

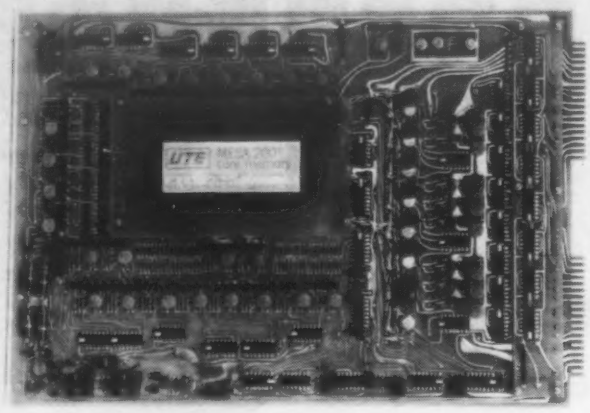
ASBURY PARK, N.J. – A single-card core memory system can now be bought for under $500 in lots of 100 from United Telecontrol Electronics Inc. The Mesa 200 will be one of the products on display at the company's SJCC exhibit.

The Mesa 200, Model 5034 has storage protection, a temperature range of 0° to 50°, and a 2-μsec full cycle time. Optional address registers are also available for this 1K by 9-bit memory.

The Model 5036 is a 4K by 18-bit memory, or 8K by 9-bit. Also having a 2-μsec full cycle, the 5036 includes address registers and party-line data registers. The 5036 is priced under $1,500 in lots of 100.

The company is also offering core plane and stack design, manufacture, and test services for original equipment manufacturer customers.

The company's exhibit will be in SJCC booth 6112.



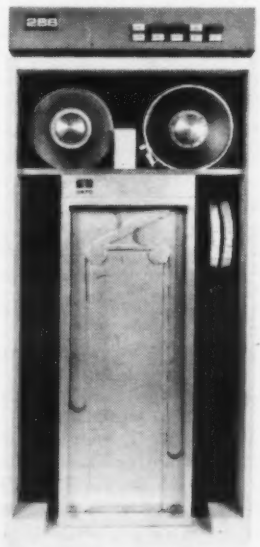
United Telecontrol's Mesa 200 Model 2034 memory system

STC to Exhibit IBM-Compatible Mag Tape Drive

BOULDER, Colo. – Storage Technology Corp.'s (STC) initial products are being introduced and will be exhibited at the SJCC.

They are plug-to-plug compatible with IBM equipment and are designed for use with the 360 Models 30 and up. STC will also offer its products to original equipment manufacturers.

Four basic models will be offered with speeds up to 200 in./sec. All models offer cartridge loading, automatic threading, single capstan drive, on-line servicing and modular construction. Phase encoding at 1600 bit/sec with automatic gain control will be offered at all speeds. Simultaneous read while write and NRZI recording will be offered on certain models. The



STC's 2400 Tape Drive

design standards stress quality, reliability, and serviceability contributing to a new standard of cost/performance.

The company is exhibiting in SJCC booth 10009.

Imlac Display Computer Selling for $18,500

WALTHAM, Mass. – Imlac Corp. is introducing a new display computer, the PDS-2, during its SJCC display.

The PDS-2, starting at $18,500, comes with an 8K memory expandable to 32K, a light pen, hardware loops for vector generation, built-in bootstrap, maintenance console, CRT display screen, and interface channels for local peripheral units, the company announced.

Standard software to be provided includes alphanumeric and graphic editors, full graphics local editor, and a utility package including an assembler, a debugging system, and diagnostic routine. The graphic editors are compatible with most time-sharing services, the company said.

The company's new display system will be on display at SJCC booths 5711-12.

We figure a brand new company in the computer industry should go looking for trouble.

Ten months ago we opened Computervision. We started with a bunch of brainy guys and some good experience.

But lots of new companies have brainy guys with experience. So we went looking for something else: trouble.

We wanted to put our brainy guys to work on problems that nobody had ever solved before.

Thwack.

You see, David was a fairly gutsy little shepherd. But he would have been a totally unknown fairly gutsy little shepherd if he hadn't decided to take a shot at Goliath.

So we went looking for problems. And we found them:

Nobody.

Nobody had ever made an automatic integrated circuit mask-alignment machine. Nobody had ever made a creative computer graphic system. Nobody had ever perfected a low cost photoplotter.

Somebodies.

Suddenly we were in the computer-controlled automation business. And we brought in more brainy guys to show we meant it: Ken Levy for the mask-aligner, Dave Friedman for the creative computer graphic system, Joe Sliwkowski to perfect the photoplotter, and Mike Mendelsohn to tie in the whole operation with software.

Then we went to work.

That was eight months ago.

Today we humbly announce our Autolign 2686™ automatic mask-aligner. Our INTERACTgraphic1™ creative computer graphic system. And our Compucircuit 100™ photoplotter.

Ho-hum.

In fact, we don't just announce them: We're already shipping them.

Right now, real time.

These were no small problems. People have refined computer systems in all kinds of ways. What they haven't done is improve the interaction between man and computer in creative problem solving. But we have with our four foot interactive surface, INTERACTgraphic1™.

And they haven't provided highly accurate, low cost tools to capitalize on the product of this interaction. But we have with our Compucircuit 100™.

And they haven't used special purpose computers to solve the biggest problem in IC manufacture. But we have with our Autolign 2686™ automatic mask-aligner.

Tomorrow.

Now we start looking for trouble again: It won't be hard to find. And half our new products are probably just sitting around waiting to be invented.

So pretty soon we'll be putting together more brainy guys to solve another problem.

Some day we may put you in bed with a computer.

And we'll keep looking for new ways to make a man and a computer interact better.

Because lots of people have made computers more creative. We want computers to make lots of people more creative.

So please take a look at what we've done. SJCC Booths 13015-16. But why wait, write Computervision, Northwest Industrial Park, South Avenue, Burlington, MA 01803, (617) 272-7240.

Computervision Corporation

Look. If you've got the computer. we've got the vision.

Products on Show at Spring Joint

DEC Exhibits One of Largest PDP-10 Systems for $1 Million

MAYNARD, Mass. – Digital Equipment Corp. (DEC), the leading manufacturer of minicomputers, will affirm its commitment to supply large computers by demonstrating at SJCC one of the largest and most versatile PDP-10 systems ever configured, according to the company.

Valued at approximately $1 million, the system will consist of extensive core memory and random access storage, and a variety of peripheral and terminal devices. One such device is the recently introduced LDS-1/PDP-10 line-drawing system.

Designed by Evans and Sutherland Computer Corp. of Salt Lake City, Utah, this graphics system provides true perspective, speed that produces a motion picture-like projection instead of a series of stills, and a large dynamic range and zoom capability.

The demonstration will show the PDP-10 system's capability to perform real-time operation, batch processing and time-sharing simultaneously. PDP-10 systems have been installed wordwide by commercial time-sharing utilities, university computing centers, physics, chemistry and medical research labs, industrial firms, and financial institutions.

In addition to the PDP-10 demonstration, DEC will present its newest small computer, the PDP-11. Introduced in January, the PDP-11 features a 16-bit word length and is presently available in two models – PDP-11/10 with read-only memory for $7,700 and the PDP-11/20 with standard read-write memory for $10,800. DEC's PDP-12 computer also will be demonstrated at SJCC booth 2700.

Digital Equipment Corp. intends to display one of the largest PDP-10 configurations ever assembled, according to the company. Part of the configuration shown includes disk packs, magnetic tapes, DEC tape transports, and a card reader. The total system will be worth over $1 million.

UCC 1151 Plotter Works With Cope

DALLAS – The Data Communication Systems Division of University Computing will introduce a new plotter interface for its remote terminal systems at the SJCC.

Designated the 1151-00 Plotter Interface, the unit operates with Cope (from Communication Oriented Processing Equipment) 30 series and Cope .41 remote batch terminal systems.

The interface controls UCC's 100, 300 and 2000 series digital plotters and Calcomp's 563/565 digital plotters. It accepts plotter commands via the lower 6 bits of a 12-bit command word. The upper 6 bits are utilized for speed controls.

Output from the Univac 1108, IBM 360 and Control Data 6000 series processors can be accepted by the plotter interface.

It will be on display in SJCC booth 1200.

Two-Channel Deck Uses Cartridges

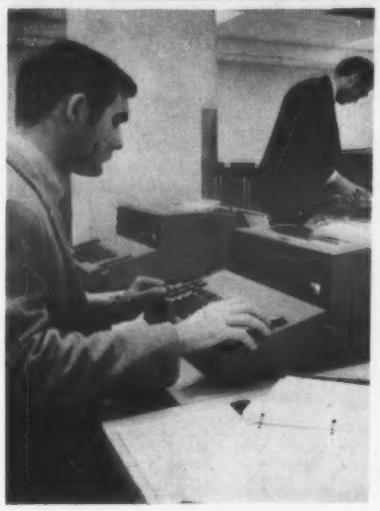
LONG ISLAND CITY, N.Y. – Auricord Division of Scovill is offering three tape decks for SJCC audiences.

A two-channel instrumentation recorder is available that uses cartridges. The Model A-4500 uses standard 8-track cartridges and has a track indicator.

The Model TR-1000, uses standard recording reels up to 1200 ft, and three four-pole motors.

The Models CAS-1/2/3 are slot-loaded cassette recorders with full playback capability. They are all two-channel and offer single-capstan drive.

The company will be in SJCC booth 50002.



Heart of the new Allis-Chalmers Dart message switching system for its computerized telecommunications network consists of this group of machines.

Network Replaces All-Manual System

MILWAUKEE, Wis. – A computerized telecommunications network has replaced the all-manual teletypewriter system previously used by Allis-Chalmers in the U.S. and Canada.

The system, linking 95 major locations, has trimmed 50% off the waiting time for completion of transmissions.

Operating since Oct. 13, the system handles about 2,500 messages daily, covering the requirements of the entire circuit in about 30 minutes, then repeating between 7:30 a.m. and 7:30 p.m.

The total capacity of the presently configurated system is 15,000 messages in the daily cycle.

This system is based on a general program from IBM called Queued Telecommunication Access Method, which was refined and modified by Allis-Chalmers to meet the company's information ensemble and method of operation.

Allis-Chalmers calls its version Dart, an acronym formed from Data via Automated Remote Terminals. Its purpose is to speed up and improve effectiveness of the control center for all telecommunications within the company's network of plants, parts depots, sales offices, warehouses and farm equipment branches.

This focal point is at company headquarters in West Allis, Wis. This location is the midpoint between numerous facilities around the country and has long served as a message switching facility, particularly because of distribution of copies of messages to various offices and divisions.

Heart of the network is the message switching system in the corporate computer center at West Allis. This system enables one of the two IBM 360/50 computers to direct and control transmission of the message load.

Following its program the computer contacts all network terminals according to a predetermined schedule. As each terminal is activated, the local operator starts transmitting. When transmission is complete, the computer signals to the next station.

The message then comes into the corporate computer center through the message switching system and it is temporarily stored in auxiliary, high speed random access storage units.

Then, when transmission time is available, the message is automatically retrieved and forwarded by the computer to its destination.

Quality Readings From Ohio River Computer-Aided

CINCINNATI, Ohio – A computer here is analyzing hourly water quality readings from the Ohio River and producing reports to aid officials in enforcing pollution-control measures.

Using information prepared by an IBM 1130 computer, the Ohio River Valley Water Sanitation Commission (Orsanco) is kept abreast of current water quality conditions along the 981-mile-long Ohio River.

Orsanco is an interstate compact agency created by joint consent of the states involved. It provides support services for Ohio, Illinois, Indiana, Kentucky, New York, Pennsylvania, Virginia and West Virginia. Each of the states either borders on the Ohio or has tributaries feeding into the Ohio.

Electronic devices at 27 stations along the river and its tributaries constantly analyze water for dissolved oxygen, temperature, pH, conductivity, oxygen reduction potential, chloride and solar radiation intensity.

Data recorded at each station is transmitted by telemeter to the Orsanco headquarters office at Cincinnati and fed into the computer. The computer combines this information with riverflow forecasts from the U.S. Weather Bureau and analytical data from the U.S. Geological Survey to produce appraisals of river quality conditions.

Robert K. Horton, executive director of Orsanco, said the commission's use of a computer makes it possible to analyze a massive amount of data and react to water problems as they are occurring.

"The objective of Orsanco is to assist the states in eliminating pollution from the river and its tributaries," Horton explained. "When the agency was created in 1948, less than one percent of the 3.6-million population on the Ohio River was served by sewerage treatment facilities. Now, facilities are in operation serving 99.5 percent of the population.

"The job is far from finished, however, because many of these facilities must be expanded to provide a greater degree of treatment.

"Our goal," Horton said, "is to bring about full compliance with water quality standards established by the commission. We also want to refine the IBM computer monitoring network so that it is even more responsive to situations that result from industrial and municipal accidents or negligence."

Citing improvements in the quality of the Ohio River water, Horton noted the river has become a major recreation source – including water-skiing, boating and swimming.

He also noted that, according to sportsmen, fish are more plentiful in the river now than in previous years. A separate Orsanco study is underway to determine the number and kinds of fish in the river.

Touch-Tone System Cuts Inventory Costs by $100,000

PORTLAND, Ore. – A telephone that knows where everything is in a manufacturing plant here has so streamlined production that its friends among the foremen say it could revolutionize industry.

The system, developed by Omark Industries, has been operational 18 months at an Omark plant manufacturing chain for chain saws. It is believed to be the first designed to do this specific job.

Trims Inventory

The system has trimmed the plant's in-process inventory cost by $100,000. It also has reduced the cost of counting inventory by saving over 200 man-hours.

Eleven Touch-Tone phones are used at various cutting chain and fastening pin production sites in the plant. A special number is called to tie into a teletypewriter. The teletypewriter signals a tone that indicates it is ready to receive information.

A coded card bearing a production operation number is then inserted into a Touch-Tone slot attached to the phone. The slot has fingers that read the holes punched in the card. The production operation number speeds to the teletypewriter, which feeds the information into an IBM 360/30 computer.

"It is then possible to retrieve and prepare at any time a full and accurate report of in-process production within the division, and the status of every open order in the plant," said Dick A. Autio, Omark's manager of materials systems development.

According to Autio, one of a team of computer and production personnel who developed the system, the computer information includes: part numbers being produced; weight per piece; description of the part; location of the part in the manufacturing cycle; the location of stored parts, and how many of each part are available.

Autio said the system has helped Omark analyze production lags, enabling control personnel to step in faster to solve the problem.

Keeps Track of Parts

"If a critical shortage of parts develops, we can look at the production situation, find where the parts are in the manufacturing process, and tell when they will be available," Autio said.

This enables the company's marketing department to better inform customers when they can expect to receive ordered products.

The system has played an important role in utilizing manpower to meet order priorities. It also has provided a springboard to improve machine loading and scheduling. Another benefit of the system, Autio said, is its ability to help people find parts thought to be lost, thereby saving the time and trouble of machining new parts.

A company wishing to adopt the system does not need its own computer if it has access to a data center. The system can be tied directly into a data center's computer from a manufacturing plant.

Computer Analyzes Soil Content To Produce Higher Crop Yields

LINCOLN, Neb. – Harris Laboratories, Inc., is using detailed computer-produced soil analyses to guide thousands of farmers to higher crop yields.

Harris' IBM 1130 computing system generates the reports from agronomists' preliminary readings on soil samples.

The computer rates acid/alkaline content and analyzes the levels of various chemicals. From this, it determines the soil's present ability to transfer nutrient elements to a plant and develops a fertilizer program that will increase productivity by optimizing this exchange.

"Until now our field laboratories were limited in the number of tests they could accept and handle," said Robert Harris, vice-president. "It would take weeks for an agronomist to complete the kind of extensive report our new system does in just a few days."

"The computer has eliminated the problems of volume and of turn-around time – getting the report back to the grower before his season begins," Harris said.

"This frees our agronomists to visit personally with farmers and to observe first-hand the results of our soil fertility programs."

Between now and September of this year, with a relatively mild winter, the laboratory probably would run 1.5 million tests, Harris said. These would involve 100,000 soil samples from 30,000 farmers, fertilizer dealers, florists, nurseries and gardeners.

A farmer specifies how extensive a recommendation he wants when he submits his samples. Field labs then obtain readings on soil acidity/alkalinity, lime, soluble salts and nutrients.

In forming its analysis, the computer merges this data with information on: previous fertilization; irrigation; previous and intended crops and yields; number of plants per acre; crop strain; row spacing and number of growing days in the sample area.

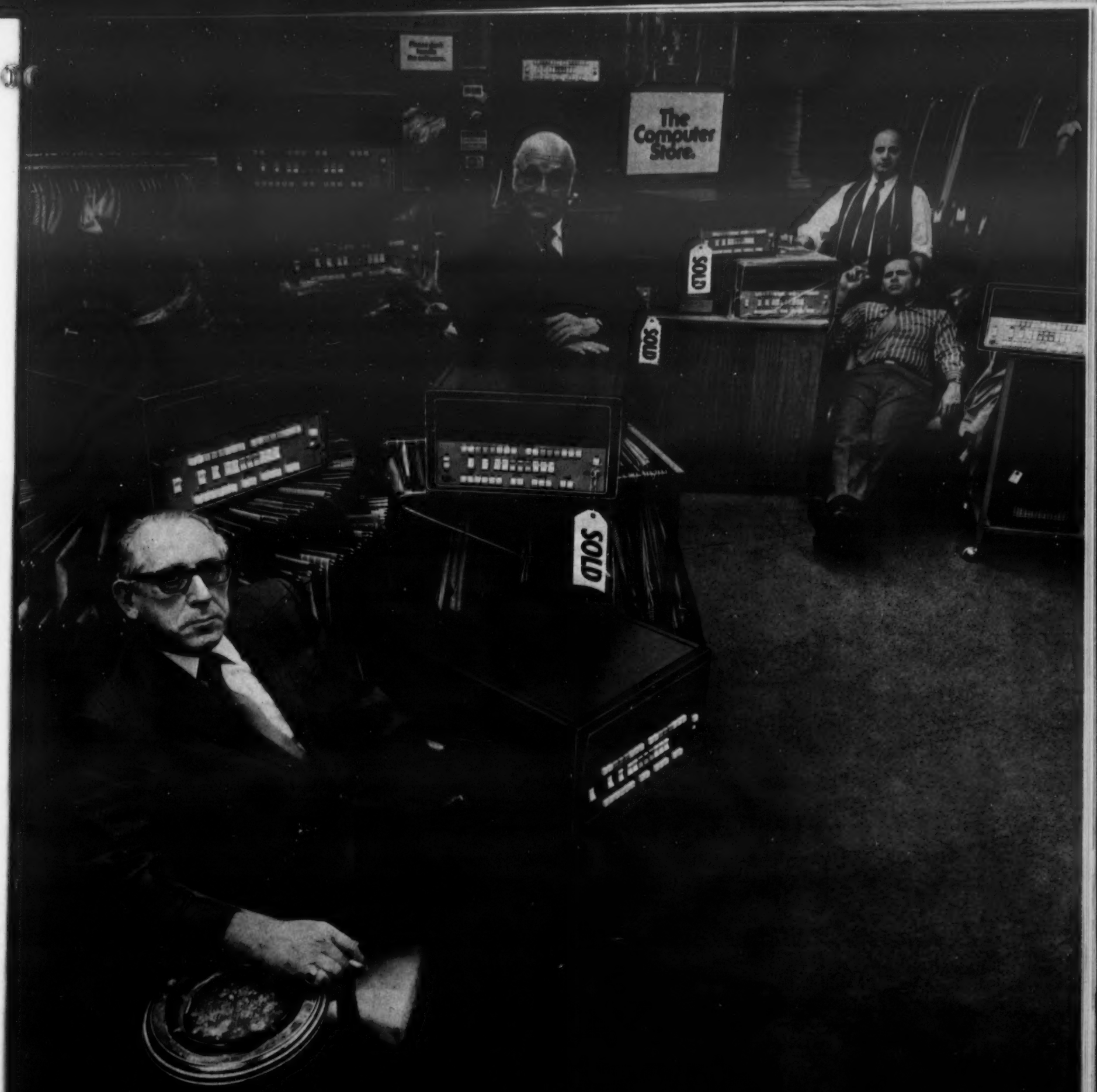
The final report indicates acidity/alkalinity content and what it should be; grades nutrient levels, stating specifically which of these levels are unacceptable and whether any are near toxic amounts.

"It's like a warehouse operation," Harris explained. "We find out what elements the soil has stored up and the computer tells us how this inventory balances out.

"Imbalances in the interaction of these elements cause problems in supplying nutrients to the plant. The computer designs a fertilizer program that will create a balance in this inventory, facilitating the exchange of nutrients."

This analysis gives the desired fertilizer composition in pounds per acre for farmers and dealers, in teaspoonfuls per square foot for smaller growers.

If it is a costly program, the computer will suggest it be carried out over several years and can recommend best methods of application.



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Body Tissue Rejection Study Uses Mice and Computer

BAR HARBOR, Me. – One of the most baffling problems in modern medicine, why the body rejects foreign tissue and organs, is being investigated here by geneticists using a computer and rare strains of inbred mice.

Dr. Donald Bailey of The Jackson Laboratory is using an IBM 1130 computer to help isolate some of the more than 30 genes in the specially bred mice.

By studying the results of grafting tissue from one mouse to another, Bailey hopes to determine what effect genes have on the body's production of antigens, the molecules on the surface of red cells that cause tissue rejection in organ transplants.

The key to how the genes control antigens has far-reaching consequences, not only in the increasingly important field of organ transplants, but in the study of cancer and immune response.

"Through the inbreeding of various substrains of laboratory mice over many generations, we hope to isolate single gene differences," Bailey explains. "Such inbreeding will enable us to study in isolation the function and chemistry of an antigen which is determined by the action of a single gene. We have indications that about 30 different genes determine antigens," he added.

Developing the right strain of mice from selected parents is a major undertaking, one that requires the assistance of the computer.

To study the rejection phenomenon, each mouse receives skin grafts from seven donor mice. More than 1,000 mice are studied each week.

The percentage of mice accepting the skin graft and the percentage of mice rejecting the skin graft are fed into the computer with the geneological record of each strain of mouse involved.

The computer is instructed to use this information in helping the scientists decide which mice should be mated to produce the next generation. Through this form of selective breeding, Bailey feels it will be possible to develop many lines of mice, each with a different gene or genes which produce different antigens.

The combinations of genes that can cause tissue rejection come to an estimated total of at least one-trillion.

Tissue grafting research involves more basic questions than the acceptance or rejection of organs. It is fundamental to a knowledge of how the body protects itself from foreign substances by means of a genetic code found within each cell.

For example, an intriguing question related to Bailey's research is why organ transplants are rejected by some bodies and cancer cells are not, even though both produce similar antigens.

The Jackson Laboratory is devoted to basic research in the role of hereditary diseases and behavior. It is internationally famous for the production and use of numerous strains of genetically controlled mice and rabbits.

New System Analyzes Flight Test Data, Eliminates Weeks of Work

MINNEAPOLIS, Minn. – An on-line telemetry acquisition and computer system is being constructed by Control Data Corp. (CDC) for Grumman Aerospace Corporation.

The system is designed to process and analyze flight test data and display results for the test engineer, eliminating weeks of post-flight data analysis required in conventional flight test programs.

Engineers will be able to monitor all aspects of the aircraft performance within seconds so that the phase of the test can be adjusted or repeated on the basis of information displayed by the computer system.

The telemetry station, which will cost more than $9 million, is now being installed at Grumman's Calverton, Long Island, N.Y., test center. The system is presently operational with a partial capability.

The system will incorporate a large scale CDC 6400 computer, three 1700 CDC computers and extensive analog and digital processing equipment designed specifically for Grumman. Included are special highly advanced information display consoles and all system operating software.

James Checco, program manager for Control Data Corp., said the Grumman installation differs from previous flight test data processing facilities in that it analyzes data on-line and in real-time while the aircraft is in flight, not hours or days later.

Three data analysis stations provide flight test engineers with real-time visual display of critical aircraft test parameters, including structural integrity, stability and engine performance, by means of the 6400 on-line analysis programs.

In addition, monitor console and computer display sections provide monitor display and simplified control of the telemetry station hardware and software configuration to the operations staff.

Frank G. Edwards, director of flight acceptance at Grumman, said the use of the system will significantly increase the productivity of test flights and provide a higher degree of safety.

"The ability," Edwards said, "to evaluate the results of a test maneuver before proceeding with the flight will reduce unsuccessful flights to a minimum with the computer monitoring all measurements and displaying to the test engineer those which exceed safe limits."

The Grumman system will be capable of operating several test aircraft at one time. In addition, it can control a laser ranging theodolite and be used in "batch" mode for general computing while at the same time performing its real-time functions. The theodolite provides positional coordinates which allow the test engineers to keep constant track of the in-flight test aircraft.

The system has been under study and development for three years and is based on the highly successful Lunar Module data reduction system that has been utilized on Project Apollo for the past three years.

The entire system, including the special software developed by CDC to control the equipment and trouble areas, will permit a large degree of automatic operation.

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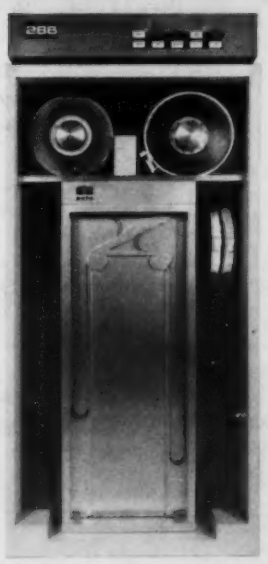

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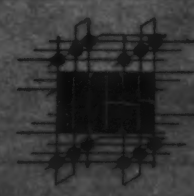

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Electronic Pushcart Helps Spot Assembly Line Problems for AM

KENOSHA, Wis. – Industrial engineers are using an electronic-laden pushcart to spot recurring problems on the American Motors assembly line.

The portable vehicle is equipped with an IBM 2740 communications terminal linked to an IBM 1800 computer by a trailing cable that connects to a multidrop line throughout the plant.

The unit, used for analyzing production line quality tests, is equipped with a standard typewriter keyboard and a printer that lists computer responses to information from the operator.

AM Director of Information Systems, John R. McGuigan, said, "By quickly spotting recurring problems on the production line through computer analysis, we can take immediate action." After singling out a car for computer review, an industrial engineer uses the traveling terminal to tell the computer everything that others have listed on the inspection history log accompanying that car, according to AM.

American Motors stated that the company has never before used a computer to spot-check the test results along the assembly line.

The IBM 1800 data acquisition control system is programmed to quickly spot any trends or recurring problems, and to print a report when action should be taken at some point in the line.

Quality tests evaluated by the computer include engine operations, paint, trim, tires, batteries, windshield wipers, cooling system, and various body assembly operations.

In addition to analyzing quality control for AM in Kenosha, the IBM 1800 also is said to provide exhaust emission control checks for cars produced here to guarantee that units fall within prescribed government limits.

Computer on wheels lets engineer quickly spot any recurring problems on the assembly line.

Electric Power In Five States Computerized

CHARLEROI, Pa. – A computerized system that can handle the massive power demand of a steel mill or the many needs of a residential customer is controlling the flow of eleetrical energy into parts of five states.

The installation, anchored by an IBM 1800 data acquisition and control system, regulates electric power for 885,000 Allegheny Power System (APS) users in parts of Pennsylvania, West Virginia, Maryland, Virginia, and Ohio.

Located in the Charleroi Power Control Center, the computer continually matches generating unit outputs with customer needs, to help assure the proper amount of power for large and small users at all times.

For example, when residential customers turn on appliances, the associated increase in power is sent to the power control center and input to the computer. The computer senses the increased power requirement and transmits impulses to the many generating outputs to raise their output.

The determination of length of impulse and the generating units to which it should be sent for maximum economy are controlled by one of more than 150 programs stored in the computer.

Homer McCarthy, supervisor of system operations engineering, said the system responds to changes in power demand on a second-to-second basis, around the clock.

The computer calculates all of the customer load requirements and adds all generator outputs to determine if the totals match. If generation is above or below customer demand at any instant, the system computes the amount of output change needed and automatically signals this information to the 44 generating units over communication lines.

To help insure foolproof operation, the APS computerized system alerts the power control supervisor to error conditions by flashing red alarm lights on the console, sounding a gong, and printing out a message on a typewriter-like terminal. In this manner, malfunctions such as exceeding transmission line limitations, frequency deviations, or loss of individual input from generators or tie-lines are noted.

APS-developed computer control also is being used to more fully integrate the operations of its affiliated companies with neighboring power systems.

What every should know about computer

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System Gives Constant Contact With Container Cargo

NEW YORK – United States Lines has developed and put into service an on-line computer system which can instantaneously pinpoint the location and status of any of the Lines' 20,000 or more freight containers.

A customer can learn exactly where his cargo is in a matter of seconds with the new systems, according to Dr. John J. McMullen, United States Lines president.

McMullen said the computer-controlled container and documentation systems, created after a year of intense study, is the second phase of United States Lines' master plan to provide the fastest cargo service to and from Europe and the Far East.

First Phase

The first phase – a fully containerized freight operation – is now in existence on the North Atlantic.

The new computer system keeps an up-to-the-minute record on all data pertaining to container movements and vessel bookings, answers all inquiries about equipment or booking status, and updates bills of lading and container historical files.

The company has an IBM 360/40 at its New York headquarters. IBM 2740 terminals are linked to the computer via direct telephone lines. These terminals are in the company's cargo forwarding offices in Chicago, Cleveland, Detroit, Boston, Philadelphia, Norfolk, Baltimore, and Port Elizabeth, N.J. A company computer service operation in Rotterdam is also tied in with the New York computer.

The containers on which the computer keeps tabs are large reinforced "boxes," rectangular vans either 20 or 40 feet long, and eight feet wide and eight feet, six inches high. Individual units of cargo are handled only twice – when placed in a box and when unloaded on delivery.

Once a cargo booking is requested by a shipper, all available information relating to the order is transmitted to the computer by the cargo dispatcher. Based on the booking order information, such as the size and type of cargo, the computer selects an appropriate box – one that is nearest the customer geographically – and assigns it to that shipper.

Monitored Electronically

That container is monitored electronically from terminal to shipper, shipper to pier, aboard ship to port of discharge, and from discharge to delivery. The box's return, reassignment or rerouting to the next customer is also recorded.

From the carrier's standpoint, United States Lines immediately knows the development and contents of every box. This eliminates the muddle of confused cargo traffic.

With this system larger shippers are assured of a continuous pipeline of cargo, because containers can be assigned on a permanent basis to long-term accounts.

In the case of a major automobile manufacturer, for example, who constantly ships equipment and parts from his distribution facility here to his major European assembly plant or vice versa, the precision of this form of "house-to-house" shipment will enable him to better plan his production timetable.

The computer file documents all pertinent information required for outbound or inbound movements. Data includes the type, weight and measurement as well as the commodity description of the cargo, number of units involved, and the consignee's name and address.

As soon as the shipment reaches the appropriate containerport, confirmation of the delivery is sent to the documentation computer, where it matches the data previously recorded in the container control memory disk, and automatically produces the "print out" of the shippers delivery documents – days before this was previously possible.

The computer shows whether a container has cargo from more than one shipper and also indicates the exact shipping procedure. There are four: "house to house," "house to pier," "pier to pier," and "pier to house."

Rotterdam Center

When the loaded container vessel sails, the computer prints out the complete manifest. This and supporting documents – the container list, arrival notice, delivery receipt – are airmailed to the control center in Rotterdam.

The cargo's port of discharge receives copies of the manifest to facilitate unloading and movement of the cargo inland to final destination.

This information arrives days in advance of the scheduled docking, and dispatchers can immediately notify the consignee of the arrival and pick-up/delivery procedures.

Canadian Hospital Installs Software For ECG Analysis

QUEBEC, Canada – Laval Hospital's Institute of Cardiology recently installed a computer system for electrocardiogram analysis, the first computerized ECG system in a working medical environment in Canada.

The system will eventually analyze about 90,000 cardiograms per year, and will also be used for various medical laboratory research applications and to monitor proceedings during heart catheterization.

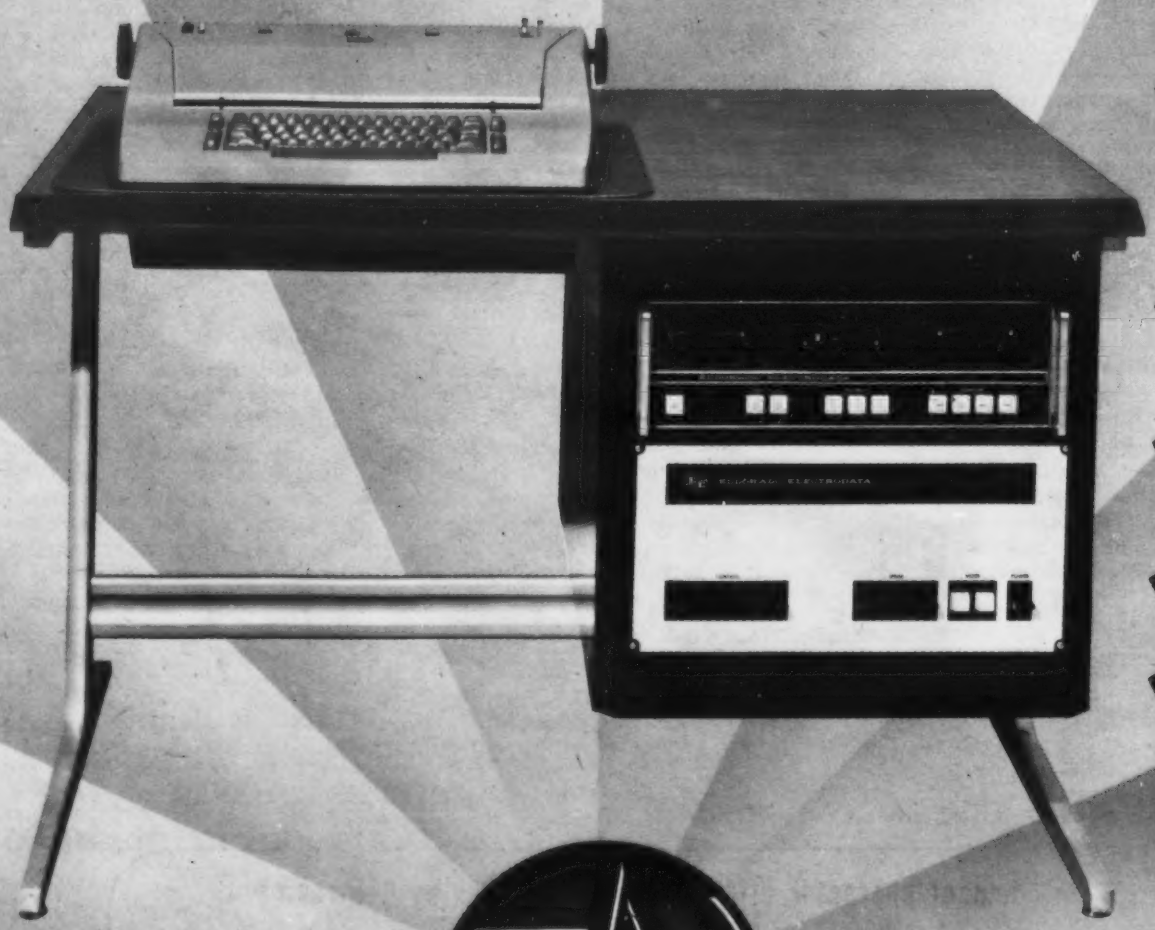
Cardio-Test, a Control Data software package, will provide the hospital with a real-time, on-line method of analyzing ECGs immediately, rather than batching readings on magnetic tape and rerunning the tape. Other specialized programs will be developed at the hospital.

In addition, portions of Medlab, a medical software system developed on a CDC 3300 system at the Latter Day Saints Hospital in Salt Lake City, Utah, will be converted to CDC 1700 computer language and used to monitor heart catheterization of intensive care patients.

The CDC 1700 computer system could provide ECG analysis service for the entire province of Quebec. Practically all hospitals in the province, some 1,000 miles away, can be serviced through remote terminal data acquisition equipment over telephone lines.

Post-operative heart patients at Laval Hospital will be connected directly to the computer which will instantly analyze pulse responses from various parts of the body simultaneously. Analog-to-digital equipment will convert the impulses into readable form for physician observation.

COMPLETE COMPUTING SYSTEMS AND COMPUTERIZED DATA TERMINALS



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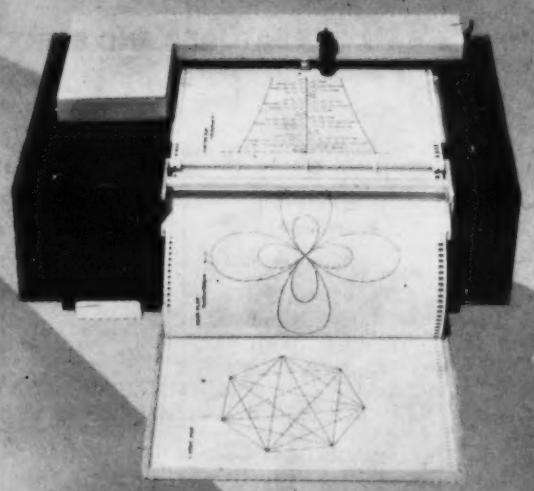

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DEC PDP-12 Used to Study Human Memory Retrieval

TORONTO, Ontario – Have you ever wondered why you remember some things and not others? So have Drs. Bennet Murdock and Endel Tulving, psychologists at the University of Toronto, who are now planning research projects that will add to our knowledge of the human memory.

Using a Digital Equipment Corp. PDP-12, Murdock and Tulving will study short-term recall ability and the human memory's ability to retrieve stored information.

With the computer's built-in CRT display, Murdock will show a group of words, perhaps 20, to a subject for a few seconds. The subject will be asked to memorize the words while they are displayed on the screen.

The subject then will be asked to use a keyboard attached to the computer to tell the PDP-12 what words were displayed on the screen. The person will not usually be able to remember all the words, but he will type in certain clusters.

After the subject has responded, the computer will display a new set of words dependent upon his first response. The computer may, for example, display the same words but in a different order to see if the subject remembers the same cluster or clusters of words.

The computer may also display a whole new set of words, so that Murdock can determine if there is a relationship between the words remembered in the first set and the second.

"When programmed properly," Murdock said, "the computer provides quick flexibility to respond to a subject's previous reply."

Using the computer, Murdock will be able to test some current theories of human memory and develop some new ones. He may also be able to suggest ways to present material to people for easy or difficult recall.

"I believe that what often is called memory loss is, in reality, a problem in retrieval of information," Tulving says. "For instance, if you were asked to name the books you read in the last year, you might well have difficulty remembering the titles.

"On the other hand, if you were asked to select those books from a list presented to you, you would probably have little difficulty. This suggests to me that the information was available in your memory but not readily accessible."

University of Toronto psychologist, Dr. Bennet Murdock, checks a program he is writing for his research into human memory.

Tulving expects to use the computer to test out his point of view, as well as to test other theories and develop a few new ones. He points out that with the computer he can now do experiments that require fast decisions on what to display next, which would have been impossible to do without a computer. He indicates that many problems or experiments can be handled without a computer.

"But, for problems requiring decisions as to what step to take next based upon the information being gathered, while the experiment is in progress, the computer is a necessity," Tulving said.

Australia to Complete Automated Dog, Horse Racetrack Betting

MINNEAPOLIS – The Totalizator Agency Board (TAB), the official off-track betting organization for the state of Victoria, Australia, will complete automation of its dog and horse race betting services with computer systems from Control Data Corp.

TAB will add five CDC 1700 computer systems and 1,000 ticket selling machines to its present CDC dual 3300 computers to improve off-track betting services at its 220 agencies in Melbourne, and the large telephone betting auditorium that will service nearly 64,000 account holders throughout Victoria.

Together these locations can now handle as many as 100,000 telephone bets and several hundred thousand agency bets per hour with an annual volume expected to reach $220 million this year.

Installed in TAB's Melbourne agencies, the ticket selling machines will relay information to and from the five 1700 computers. The 1700s in turn communicate with the dual 3300 computers located at TAB's central site, sending bet summaries and receiving results and race data.

This is how a typical bettor entering a TAB agency would use the remote input-output terminal (Riot) ticket selling machine.

He places his bet with the agency operator, who keys the information into the Riot, which transmits the data to the computer serving that particular agency.

The computer validates this information (name of horse, number, day of race, track, etc.) and if it is acceptable, returns a message to the Riot to print the ticket.

If the information is invalid for any reason, the computer message indicates why. When information is corrected, the validation process is repeated and the transaction is completed.

If the bettor holds a winning ticket, he may present it for collection at any TAB agency in Melbourne. The Riot again sends the ticket information to the computer for validation and the computer returns a message indicating the amount to be paid.

Special systems have been developed to make this computerized information relay possible.

Remote issuing machine for integrated real-time execution (Rimfire) automates the front counters at all TAB agencies.

Computer automated real-time betting information network (Carbine), the master operating system, permits communication between the central 3300s, the five 1700s and the Rimfire network.

Carbine allows the immediate relay of track information, such as when a horse scratches, to Rimfire and also enables TAB management to follow the betting totals for one or all tracks and their agency receipts and disbursements.

Beginning this month, Riot ticket selling machines will be manufactured at Control Data's new Systems Division in Melbourne.

Minicomputer Used for Television Colorimetry

TOKYO – The Japan Broadcasting Corporation (NHK) is using a small general purpose computer in an automated system that performs colorimetric analysis of pictures coming from a color television camera.

The system is used to detect colorimetric distortions in the transmitted picture, permitting qualitative evaluations of television camera performance.

The system, which includes a Digital Equipment Corp. PDP-8/S computer, a Teletype, an analog-to-digital converter, a channel scanner, and a special sample holder for the input television signal, is totally housed in a single wheel-mounted cabinet, facilitating its placement during testing and monitoring functions.

Prior to development of the system, the functions it performs had to be done factionally, either manually or off-line using large computers.

The NHK Technical Research Laboratories, where the computerized system is being used, is examining problems associated with the quality of television pictures and the handling of picture signals, especially in designing or evaluating color TV cameras.

The problems associated with color operations are complex. Because of the color sensitivity differences between a television camera and the human eye, it is difficult for a person to estimate the quality of a color picture by the presentation of the signal from the camera.

Further, although it is possible to use conventional means to measure the signal elements and calculate the color information, these means are difficult, troublesome, and time consuming.

By contrast, the computer-controlled colorimetric measuring system aids in the estimation of colorimetric distortion produced by a camera under test. It performs its operations quickly and with adequate precision, feeding back data when required, for use in succeeding tests of the camera to improve its performance or design.

Computer-based colorimetric analyzer for television camera performance developed by NHK (Japan Broadcasting Corp.) checks the quality of color signals coming from the camera.

DEC's 'Indac-8' Helps Research Proton Beam

UPTON, N.Y. – A computer-based industrial data acquisition and control system, called Indac-8, will be used to help physicists monitor and control the characteristics of one of the high energy particle beams used to study the nature of matter at Brookhaven National Laboratory (BNL).

The proton beam, accelerated by BNL's alternating gradient synchrotron to energies as high as 33 GeV (billion electron volts), strikes a variety of targets located at various points around the circumference of the synchrotron "ring." These collisions produce an abundance of "secondary" particles which come from the target in all directions.

Magnetic optic systems, called secondary beam transports, are used to select a particular particle momentum and mass and transport them to various types of detectors.

An important step in the setting up for any particular experiment is the final, fine adjustment of the various parameters associated with the beam. This operation is referred to as "beam tuning."

The Indac-8 system, composed of a Digital Equipment Corp. PDP-8/L computer with a 32K word disk file and a general purpose industrial software package, will be used to support the beam tuning process. It will monitor magnet currents, particle counters, counter positioning equipment and other devices used to control and measure the beam's characteristics.

Gary Smith, project engineer at BNL, explained that the researchers, resident and visiting, using the facilities generally have limited funds and time to conduct their experiments. "Each beam burst charged against a researcher's limited time and funds must contribute substantially to the value of the experiment," Smith commented. "Although we are in the preliminary stages of implementing computerized beam tuning, this new technique will be more efficient than the older methods."

Utility Company Gives Computerized Reply To Customer Question

GRAND RAPIDS, Mich. – A computerized information system is providing answers at the push of a button to service questions asked by some 340,000 customers of Consumers Power Co. here.

The service is provided through the use of computer terminals connected via telephone lines to an IBM 360/50.

A customer's call is received by a representative who enters the customer's name and address or account number directly into the computer using an IBM 2260 terminal. Within seconds the cutomer's account record is displayed on the terminal screen, enabling the operator to answer queries about current and previous usage and rates.

Vice-president of services, F.C. Fisher said: "In the past, customer requests necessitated a manual search of records. The new system assures that current information is readily available."

The customer information system has been initiated by the company at its Grand Rapids, Jackson, and West Wayne divisions. Consumers Power plans to extend the service to other areas in Michigan in addition to adding other services to the system. These will include preparation of orders for installation or termination of gas and electric services, and the repair of appliances.

The system will also be used for automatic inventory control of meters throughout the state, according to Fisher.

Expansion of the customer information system calls for more than 200 terminals to be located across the state by 1973.

"Where was it they held the Spring Joint in '70?"

After the ball is over you probably won't remember too much about Atlantic City. Oh, sure, the word "Boardwalk" might conjure up something more than a Monopoly game in your mind.

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Collecting data on exhaust emissions from motor vehicles, a Travelers Research Corp. technician sets up mobile air sampling equipment beside an expressway near downtown Hartford. Using an IBM 360/40, Travelers Research has analyzed thousands of similar test measurements to determine levels of air pollution from motor vehicles and other sources throughout the state.

Can't Breathe? Computer Measures Air Pollution, Suggests Solutions

HARTFORD, Conn. – Scientists here are testing various methods of reducing air pollution by simulating atmospheric conditions in a computer.

The research, aimed at producing specific recommendations for improving Connecticut's air quality, is based on a mathematical "model" developed by the Travelers Research Corp. (TRC).

In addition to simulating pollution in the atmosphere the computer also has analyzed thousands of actual air quality measurements. These calculations, according to Travelers Research, show that pollution in some areas exceeds acceptable limits by 50% to 125%. Predictions of future pollution levels are also possible.

Glenn R. Hilst, TRC executive vice president, commented on the use of the computer model:

"Only by knowing why, when, and where we have polluted the air can we make sensible recommendations on controlling pollution. The computer is already giving us a great deal of this information, and is improving our ability to analyze it."

Hilst does not expect the computer, an IBM 360/40, to provide simple solutions, however.

"The problem is too complex," he said. "For example, each type of pollutant, including sulfur dioxide and particulates, the airborne materials that cause smoke palls and grimy films of dust, presents three major problems.

"First, we must improve those areas where pollution already exceeds acceptable limits. Second, we must control pollution sources where concentrations are approaching unacceptable limits. Finally, we are looking for potential problems where no pollution exists at present."

Further complicating the problem, he said, are the multitude of pollution sources, and constantly changing weather conditions.

"There also are a number of social and economic questions – the cost and acceptability of proposed solutions, for example. Only with computers is it possible to carry out the millions of calculations needed to evaluate all these factors."

A research team headed by Arthur W. Bostick developed the pollution model over a two-year period.

To formulate the complex mathematical equations that make up the model, exhaustive data on pollution caused by motor vehicles, power plants, factories, home heating units and other sources was fed into the computer.

The data was gathered from 25 strategically located measuring stations and from specially equipped trucks and aircraft operating along Connecticut's borders. These mobile measuring stations made it possible to measure pollution from sources outside the state.

For each station, it was determined how often and under what conditions air quality failed to meet standards set by the Connecticut Clean Air Commission.

By reducing this mass of data to meaningful form, the computer makes it possible to test many alternative methods of improving air quality. Among these might be rescheduling the operations of certain industrial plants at critical hours, or restricting the use of automobiles or oil burners. Even future technological advances, such as the widespread use of battery powered vehicles and nuclear power generation, can be evaluated.

The computer analysis shows that pollution exceeds acceptable limits in several regions of Connecticut, including parts of the coastal zone. In other areas, pollution is approaching permissible limits.

Bostick's group is applying the computer model to air pollution control for metropolitan Toronto. As the model can be adapted to simulate any set of atmospheric conditions, he foresees the possibility of its use in many other urban areas.

Computer models should help to answer many questions about air pollution. Little is known, for example, about the effect of pollutants on drivers' reflexes, or the influence of over-the-road structures on the dispersion of pollutants.

Computers Down-on-Farm Aid Irrigation Project

HONOLULU – U.S. farms of the future will be highly computerized operations, according to J. Philip Campbell, undersecretary of agriculture.

Campbell predicted that in the near future, computer-controlled machines will plant the crops, fertilize by prescription, determine the right time to market, harvest on order, and grade and package commodities for delivery to automated warehouses.

In addition, farm animals will be housed in environmentally controlled shelters, Campbell said.

Farming is already moving in the direction of computerization. Officials of the Agricultural Research Service (ARS) have developed a computer program to predict the time and amount of the next irrigation.

The time-sharing program estimates soil moisture depletion, the timing of the next irrigation, and the amounts of water to be applied.

The current study includes 24 farms, 43 fields, and 14 crops throughout southern Idaho.

To use the program, a technician visits the farmer or irrigation manager, who supplies some of the essential information going into the computer.

Upon receiving data concerning evapotranspiration, crop water use, dates, and amounts of last irrigation or rainfall, the computer automatically furnishes the necessary information to the farmer.

The printout includes crop and field identification, date of last irrigation, rainfall since last irrigation, estimated depletion of soil moisture, optimum depletion, estimated days before next irrigation, approximate amount of water to apply, and a general climatic forecast.

Cost for the service is about $1 an acre. The studies are continuing with the cooperation of the U.S. Bureau of Reclamation and the U.S. Weather Bureau.

In a related development, the American Agricultural Marketing Association (Aama) recently announced the establishment of a computerized "supply-demand data center" for livestock.

The center will operate as a part of Aama's livestock division, and will serve member state farm bureau marketing associations with timely marketing information.

Allegheny Leases Computers

WASHINGTON, D.C. – Allegheny Airlines will lease two computer systems from Armco Boothe of San Francisco.

The $7,585,000 transaction includes the eight-year lease of two IBM 360/65s and the five-year lease of remote terminals for Allegheny's new Pacer 360 passenger reservations and flight information system.

The computers will be installed in the Data Processing Division of Allegheny's management information services department in Washington.

Blood System Locates Potential Donors Automatically

MILWAUKEE, Wisc. – The Milwaukee Blood Center here is using a computer to distribute blood more efficiently and to maintain up-to-date files on blood supplies and potential donors. In addition, the center hopes to develop a test within the next three months to detect potential donors who are carriers of infectious hepatitis..

Called Abiis (Automated Blood Inventory Information System), the project is one of four funded under a grant from the National Heart Insititute (NHI). Other Centers are located in New York, Buffalo, and Chicago.

The four centers have been working independently over the last two years in an effort to find out how computers can assist blood banks.

Dr. Richard Aster, executive director of the center, said that the test to identify hepatitis carriers was presently being perfected and should be in operation by July this year.

Screens Carriers

The test will be a "very important advance in blood banking," he said, and will screen out more than 50% of the hepatitis carriers.

The Milwaukee system is designed for a Sigma II computer. In addition, two 7-track, slow-speed tape drives, one three megabyte Random Access Device (RAD), and six teletypewriters are used.

The blood center supplies blood for the Milwaukee area containing 33 hospitals in four contiguous counties.

Each day, about 250 units of blood are used in these hospitals. Information about the amount of blood needed is fed into the Abiis system, either through the telephone or by means of a Teletypewriter, according to Dennis Roseth, supervisor of the computer center.

The amount of blood is recorded on a teletypewriter in the order department of the center each time a unit of blood is sent out to a hospital. The computer also records each unit of blood donated to the center.

Files on the amount of blood stored in the center are maintained by a series of reports generated regularly by the computer.

A status report provides a detailed inventory of the available blood giving the amount and type of blood at any one of the participating hospitals, and then tells how old that blood is. Entire inventories of selected blood types, or all blood types, are also available, he said.

Expiration warnings are also available from the Abiis files, which indicate "outdates." Since blood "dies" if stored longer than 21 days, warnings are necessary to indicate the various ages of blood units at various hospitals.

indicates how long blood has remained unused in any hospital. This indicates the number of units of blood that have been at a particular hospital for any specified time period.

An age distribution of blood at any hospital indicates in matrix form the amounts of blood available in any of the eight blood groups at any age up to 21 days.

In addition to these reports, others are available which indicate when and where blood was used, along with information about potential donors.

Information about people who express an interest in donating blood is also fed into the computer. The computer then, on request, can produce a list of names, blood types, telephone numbers, and even the shifts that the donors work.

Mini Watches Water Supply For 700,000

DENVER, Colo. – The water supply for 700,000 city-dwellers is being controlled with the help of a computer small enough to fit in a kitchen sink.

The computer in Denver's board of water commissioners office watches over pumping stations, storage reservoirs, and hundreds of miles of underground conduits to help ensure a plentiful water supply and adequate water pressure for the city.

At the West Side office, the flow rates from 21 pump stations, the water depth of eight storage reservoirs, and the electricity demand at each station are received in a central control room where dispatchers can regulate the city's water supply efficiently.

The computer-based system was installed primarily to conserve electricity at pumping stations. The board of water commissioners buys the electrical power it uses, and they are billed by the highest 15-minute rate of electrical consumption per month.

The computer, a PDP-8, helps keep power consumption at as steady a level as possible. This, in turn, helps keep consumer costs at a steady level. The computer also figures out the electricity bill.

By having the water consumption rates at its fingertips, the board of water commissioners can program the pumping rates and maintain the reservoir elevations.

For instance, if there is a drop in water pressure in an area of the city, the pressure drop would be picked up by a pressure gauge or chart. One of the supervisors in the dispatching section could then order a local pump be started and bring the pressure back to normal.

Before the computer was installed, a dispatcher had to read a panel of gauges that registered water flow and pressure, and then make calculations manually.

Phase II, which will begin this year and be completed in 1971, will see such data as pressures and valve positions and fill rates tranmitted to either the West Side station or two other main pumping stations by radio. The information is now brought in over telephone lines and evaluated manually.

EDP Firm Trains Students Stranded by School Closings

By Anne Nolan
CW Staff Writer

WASHINGTON, D.C. – More than one computer school has closed on short notice in recent months, leaving its students in the middle of a course with full tuition paid. And, if the school has closed because of financial difficulties, there is little restitution students can get or expect even through legal channels.

One school in Boston, the Institute of Computer Technology, closed without prior warning on Jan. 16 because of "financial difficulties" [CW, Jan. 28].

Another school in the Washington area, Automation Institute of Falls Church, Va., never reopened after the 1969 Christmas vacation.

But Computer Learning and Systems Corp., a large computer services and career training company, through the National Association of Trade and Technical Schools, is doing something about it. It has offered to step in and assume the responsibility for training the students left stranded in mid-course.

Industry Problem

Eugene Axelrod, vice-president and general manager of Computer Learning, feels that such closings are an industry problem and other EDP institutions share the responsibility.

According to Axelrod, there is no way to avoid ill feeling when a school closes its doors unexpectedly, but Computer Learning does have first-hand experience with making the situation less destructive.

"Back in December, 1969, we got wind quite by accident that a well-known EDP school in the Washington area didn't intend to reopen after the Christmas recess," Axelrod said. "Our first thought was that 'it was none of our business,' but the more we thought about it, the more we realized we should do something because it affects all schools.

"Nobody asked our help, but we contacted Bill Goddard at the National Association of Trade & Technical Schools to confirm the report and to offer Computer Learning's assistance."

Complete Instruction

Axelrod, discovering that the report was true, offered to take on the 60 students who were affected and to complete their instruction without cost to them. Instructors from Computer Learning worked with the students to determine their existing levels of proficiency and to work out a training program to assure they got the course coverage equivalent to that they had expected from the school. Although skeptical at first, the students soon realized that no costs were involved to them. Forty-seven of the 60 students accepted the school's offer.

Education

Computer Learning's decision to get involved was a touchy one – to risk its reputation through guilt by association. According to Axelrod there was absolutely no connection between Computer Learning and the school that closed, Automation Institute, and he felt the risk wasn't that great.

"When any EDP school goes out of business because of poor financial conditions or other causes, it automatically tarnishes the image of every school. So one has to decide whether to sit there on one's hands or do something. We decided to do something," Axelrod said.

He stated that Computer Learning certainly couldn't afford to continue bailing out other schools but it was a problem that should be shared because of concern with the quality of education that EDP schools offer.

No Regrets

Axelrod said that it was hard to project exactly what this effort cost in dollars and cents, but he didn't regret being involved.

Following the enrollment of 47 students at Computer Learning and the subsequent two-week training period, a follow-up survey was done to monitor their progress and assess their attitudes. According to the school, the reaction was overwhelmingly positive and there are now 47 people who can give realistic advice on how to choose an EDP school.

Plan Backs Educational Study, Technology in Class

WASHINGTON, D.C. – A six-point $565 million program to bring the use of technology and educational research into national classrooms has been proposed by Sterling M. McMurrin, chairman of the Commission on Instructional Technology.

McMurrin's proposal outlined a $150 million expenditure to establish a National Institute of Education and a National Institute of Instructional Technology within the Dept. of Health, Education, and Welfare (HEW).

According to McMurrin, the remaining $415 million would be required for first-year operations, to include $250 million on research and development and application activities in the institutes, $25 million for a center "library" of educational resources, $100 million for demonstration projects, and $40 million for personnel training.

Limping Along

Testifying before the House Select Subcommittee on Education, McMurrin said the institutes would coordinate research and experience in educational use of television and telecommunication devices. "A society hurtling into the age of the computer and the satellite can no longer be held back by an educational system which is limping along at the blackboard-and-textbook state of communication," he added.

U.S. Software Spokesmen Address Datadecade Computer Conference

NEW YORK – Three major spokesmen for the American computer service industry will address 500 European attendees at Datadecade, a one-day conference in London, April 29.

The speakers will be Saul Steinberg, chairman of the board and chief executive officer of Leasco Data Processing Corp., an international computer, consulting and financial service corporation; Dick H. Brandon, president and treasurer of Brandon Applied Systems, Inc., New York, an international management and technical consulting firm; and James P. Hassett, a Wall Street consultant on computer and other high-technology acquisitions and new ventures, and until 1969, founder, chairman and president of Cyber-Tronics, Inc., a computer leasing, service and supply organization.

The conference, sponsored by the National Computing Center (the British Government-financed agency assisting computer users), will examine the growth prospects and problems facing the British computer service industry.

The British speakers include representatives of the British Ministry of Technology and the Industrial Reorganization Council (a British government agency), directors of the major UK computer manufacturers, IBM and ICL, as well as John Hoskyns, founder and managing director of the Hoskyns Group of companies, and Kenneth Barnes, managing director of Systems Programming Ltd., two of the leading European software organizations.

Datadecade, regarded as the leading computer conference of the year in Britain, was organized by BIS-Brandon, the British arm of Brandon Applied Systems, Inc.

Source of EDP Personnel 'Shift' Problem Is Poor Resources Management : Rohan

By Kenneth Rohan

I don't think there is a personnel drain, but rather a new personnel shift. The source of the problem, as it has always been is shoddy management of resources.

In the beginning, most companies had tabulating rooms where EAM or unit record equipment churned out accounting journals, inventory reports, payrolls, and many other business reports. Very often the machine operator was the same person who designed the job flow and wired the control panels or plugboards. In short, the operator was also the "programmer" of the "tab" equipment. Through promotion, this person could someday become supervisor or manager of the tabulating department.

With the advent of stored-program machines (computers), manufacturers encouraged their customers to separate programming activities from the operating areas. In addition, they urged the hiring of only people with college degrees to fill the newly created job description called programmer.

Men with company seniority in the tab room were given programmer aptitude tests to qualify for a new career. Thus, many companies found themselves with a programming department separated from the operations department.

Of course, each grew quite larger than anticipated. The need for "documentation" gave birth to the programmer/analyst or DP systems analyst category which became a higher salaried haven for programmers to advance.

DP People Exposion

During this DP people explosion, many were promoted to supervisory or managerial positons. When a programmer or operator was given the title "manager," at what point did he actually begin to function like a manager? Some never did.

Surely the role of manager is different than that of a non-manager. What was the difference? Many of these new managers were never afforded the opportunity or encouragement to learn the science of management. For the most part, businessmen waited for their data processing costs to get into line with their other expenditures only to see them continue rising amid a sea of excuses.

Kenneth Rohan disagrees with the solution for "plugging the EDP personnel drain" expressed by Joseph Surkis [CW, April 1]. He says his own DP experience suggests that the Diebold study has great validity. From 1956-69, Rohan served on the programming, supervisory, and management levels at IBM. He is now a researcher for a large credit card company.

Viewpoint

By 1966, budget responsibility involving millions of corporate dollars was in the DP management hands of former programmers and operators who were never trained for the task. Although one should continually strive for self-development, this group cannot be blamed anymore than parents who were never trained to be parents.

Part of an executive's job is to develop the people reporting to him and this is where the businessman failed. There are too few companies that actively seek or encourage management development courses for their DP management or any of their management for that matter.

Mainly they rely on a man getting on the job experience, which is a good principle also, but why must it cost millions to get the experience?

People are job hopping for many reasons, the most important of which could be insecurity. An insecure DP manager can cause a ripple through an organization very rapidly. Poor personnel review handling, shoddy salary administration, inept budgetary practices, lack of management consistency are major contributors to insecurity. Notice that none of these has anything whatever to do with data processing. Insecurity in most companies is best known by the term "morale problem." A trained manager is seldom insecure.

Lately, a second dominant reason for large turnover is the movement of DP people to software firms, consulting and facilities management organizations. A programmer has virtually no career path to speak of in a business organization that merely uses DP equipment as a tool.

Very few companies promote men out of the DP area into the corporate mainstream. The same programmer has an almost unlimited opportunity with a software or facilities management firm whose only business is data processing.

I would encourage businessmen concerned about their turnover problem – don't fight it too strongly. Try to save or hire personnel with good records of DP achievement and, in your opinion, good management potential. Provide them with an environment of periodic education on the fundamentals and science of management such as planning, organization, budgets, direction, leadership, and so forth. Teach them *your* business and your business goals, then rely on them to manage the DP affairs of the company.

If an in-house staff is a hard, fast requirement, these kinds of managers will be best equipped to manage those resources.

More and more business firms will begin to rely on outside DP specialists for total DP requirements.

Simply stated, if a firm has a unique problem there probably exists a DP organization that has already solved a similar problem and can do it easily again. An in-house staff will always take longer, cost more and only partially solve the problem.

The era of the DP professional is beginning and the businessman will have to protect himself from "these outsiders who talk a strange and expensive language." A sure-fire way is to have on board, a trained, secure and corporate goal-oriented DP executive.

Computer's Math Solutions Rescue Dads

AKRON, Ohio – Fathers who feel lost nowadays when asked to help high schoolers solve a new math problem can take solace in a computerized system being implemented by the Akron Board of Education.

The system, a centralized computer being used to serve the needs of area high school students with on-site terminals, is reportedly one of the first of its kind in the country.

An IBM 360/30, located in the board of education building, has typewriter-like terminals in four secondary schools that are linked to the computer by telephone lines.

Available on an elective basis, the system enables a student, seated at one of the terminals, to write a simple computer program and solve a variety of math and scientific problems.

The system also is being used to provide students with basic DP skills, such as computer operation and programming.

Using the same terminals installed for student use, teachers and administrators will use the computer for maintenance of pupil census, attendance reporting, statistical reports, and updating class enrollments and pupil records.

The computer network, when fully operational later this year, could be used by vocational guidance counselors to advise students on selecting colleges and technical schools, said Dr. John Hartzler, Akron's assistant school superintendent.

"Computers have become an integral part of processing information and problem solving, both in business and on the campus," Hartzler added.

Lawrence D. Grim Jr., a student at Akron Central High School, helps his father solve an algebra problem using the IBM 360/30.

N.J. State Colleges to Use DP Student Registration System

WEST CHESTER, Pa. – For school openings in September, New Jersey's six state colleges and Department of Higher Education will use a new student registration and information system developed by Systems & Computer Technology Corp. (SCT) and the participating schools.

Called Custom (College Universal Student Operating Modules), the system has been designed to satisfy data processing needs in admissions, registration, student scheduling, and grade and student biographical reporting.

SCT President Frederick A. Gross said the cost to each of the participating schools would be $20,000, covering the development, programming, and installation of Custom. Thomas Wendel of New Jersey's Department of Higher Education estimated that independent development of similar facilities would have totaled about $80,000.

The system is also planned for use by two additional schools now under construction.

Honeywell to Offer Systems Design Course

CHICAGO – Honeywell plans to introduce an advanced computer science course here limited to professional programmers and managers sponsored by their employers. Honeywell claims the course is the first in the computer industry geared to systems analysis and design.

The course is scheduled to start this summer as a supplement to the curriculum at computer training schools recently opened by Honeywell in several cities.

The company cites an acute shortage of computer personnel among systems designers. The shortage mainly involves users relying on computer manufacturers for systems design.

New Books

An Introduction to Computer Systems, compiled by Edward O. Joslin (College Readings, Inc.) 384 pages, $6.95.

This is the first in the Computer Readings Series, intended to keep the reader informed of the latest developments in the field of data processing by publishing selected reprints of recent articles from other sources.

The paperback contains 45 articles written by experts in the computer field. It is divided into three sections: background, applications, and technology.

The first section contains overview articles on the past, present, and future of the computer industry.

The applications section describes the standard, as well as some newer applications, in such areas as medicine, education, and urban systems.

The technology section contains articles on hardware and software today and as anticipated for the future.

Business Programming the IBM 1130, by Wilson T. Price, (Holt, Rinehart and Winston), 330 pages.

This book is intended as a reference and textbook for those interested in the use of 1130 Fortran for business applications via the commercial subroutine package (CSP). The author states that CSP is not another language to replace Fortran, but rather a set of subprograms to simplify the use of Fortran on the 1130 for business applications.

Merc Granted $102,500 For Operational Expense

LANCASTER, Pa. – The Independence Foundation of Philadelphia has awarded a grant of $102,500 to the Middle Atlantic Educationa and Research Center (Merc), a regional, time-sharing computer center here at the campus of Franklin and Marshall College.

Merc President Paul D. Newland said the funds will be used to meet first-year operational expenses of the pioneering, nonproft computer utility which serves a variety of small educational, research, and governmental agencies throughout the Middle Atlantic States.

Founded two years ago, Merc became operational last November when eight founding members were linked by telephone communication on a time-sharing basis to the center's RCA Spectra 70/46 at Franklin and Marshall.

New Literature

A four-page brochure describes hardware and software designed for medical and biological engineering applications in both clinical and research environments. Included is an outline of general software services available for system generation, statistical and mathematical programming, and other software for scientific and business applications.

Copies are available from Digital Control Systems and Computer Software Information Engineering, Inc., 6224 S. Main St., Downers Grove, Ill. 60515.

For a copy of Bulletin 665A, write Technical Information Section, Electronic Instruments Division, Beckman Instruments, Inc., 3900 N. River Rd., Schiller Park, Ill. 60176.

DSI Systems, Inc. has produced an information brochure on its "400" microsearch system and its specially designed terminal viewer. Copies of the brochure may be obtained by writing Robert W. Roth, executive vice-president, DSI Systems, Inc. 11810 Parklawn Dr., Rockville, Md. 20852.

A new catalog by Business Press International, Inc., lists the expanded services, books and programs for business and education is now being offered by Department CC, Business Press International, Inc., 288 Park Ave. West, Elmhurst, Ill. 60126.

A six-page brochure from Data Products Corp. describes the PortaCom, a portable computer communications terminal. Available from Data Products Corp., Systems Division, 6219 SeSoto Ave., Woodland Hills, Calif. 91364.

Oliver Isaac expects the Burroughs B2500 to simplify retrieval of city administrative and statistical data.

B2500 Expected to Improve Citys Record Keeping Files

Exclusive to Computerworld

HIGHLAND PARK, Mich. – Oliver Isaac, director of computer services here, looks to the October installation of a Burroughs B2500, valued at $367,000, as the means to handle an expected heavy increase in city record keeping.

Isaac's goal is to set up a "parcel" file which will centralize blocks of information about the city, its land, resources, and people, thus simplifying the method of pulling hundreds of administrative and statistical reports from the disk-file, random-access system.

100,000 Workers

Highland Park's 2.9 sq miles, containing a high density population of 38,000, is entirely surrounded by Detroit. And because several large companies, such as Ford, Chrysler, and Ex-Cell-o, have plants or headquarters in Highland Park, there is a transient working population of over 100,000. Main traffic arteries cutting through the heart of the city and carrying traffic back and forth between downtown Detroit and the suburbs compound the daily flow of vehicles and people.

Isaac also sees immediate need for data files involving such areas as land use, urban renewal, demographics, census, public works, water consumption, voter registration, assessing, licensing, and inspection.

Leasco Official Says ICL Should Seek Top Executives From IBM

By Malcolm Butler
Special to Computerworld

LONDON – ICL, the British computer company, should immediately start shopping around for top executives from companies like IBM, according to Leasco Chairman Saul Steinberg, appearing recently before Subcommittee D in the House of Commons. The Commons Subcommitte is inquiring into the future of the British computer industry.

ICL, said Steinberg, still has a great many problems to overcome. The company was put together by edict and must support, service, and maintain two unlike systems, the 1900 series and System 4 (based on the RCA Spectra range). No other successful manufacturer has this burden, he said.

One of the main problems for ICL was the size of its market. It could not support the required expenditure on research and development from the UK market alone so it must expand its market into Europe more successfully than it has to date. This could be accomplished with mergers but, suggested Steinberg, not with block mergers.

One-Company Mergers

The mergers should be first of all with one company, preferably an international company and not necessarily a European company. The new organization could then approach another company and thus gradually acquire international manufacturing, marketing, and management.

For the government to support ICL by giving cash for research and development protected the company too much, said Steinberg.

The government should let go of ICL's hand and encourage it by ordering the first 35 new systems which were both 1900 series and System 4 compatible. This would at least allow ICL to go out into the market place.

Steinberg also suggested that the British government should put its software requirements out to commercial software houses as did the U.S. Besides cutting costs and stepping up efficiency, this could stimulate a British software industry.

Steinberg confirmed, however, recent reports from the U.S. of low profits in the computer service and software industry. Out of the 10 large companies there, said Steinberg, half were under significant financial strain. This was despite the effects of unbundling in the U.S. where, on a survey undertaken by Leasco, 70% of a total of 786 companies studied were buying or about to buy services from other sources than their computer supplier for the first time.

Steinberg agreed that leasing both in Europe and the U.S. had slowed down, not because of any IBM policy, but because of a shortage of capital. This, however, will change, he said, and predicted that in the 1970s the fast growing leasing business of the last few years will "look like the minor league."

GE's FSO Realignment Provides Localized Sales

By Harvey Elman
CW Staff Writer

WASHINGTON, D.C. – Government users of GE computer systems and peripheral equipment will now receive direct, localized sales and service for the first time as a result of the company's new realignment of its Federal Systems Operation (FSO), according to a company spokesman.

J.R. Pompa, FSO manager, said that the move established three new marketing organizations – a major programs component and two support operations.

FSO is part of GE's Phoenix-based Information Systems Equipment Division which manufactures and markets the company's complete line of computer equipment from the small-scale GE-50 family to the large-scale GE-600 line.

The new marketing operations are Defense, Civil Agencies, and Field Operations.

Five District Offices

The first two will be responsible for sales and installation of computer equipment for government defense and civil agencies here. Field Operations will provide sales and service in five newly created district offices nationwide. These centers will be at Wakefield, Mass. (Northeast), Cincinnati (North Central), Atlanta (Southern), Omaha (Midwest), and San Francisco (Western).

Although the total number of employees involved was not disclosed, there will be some shifts from GE's Bethesda office.

The major program components will be responsible for providing sales and service of systems designed for specialized applications covering several functional lines.

The two new support operations are Headquarters Technical Support and Federal Market programs. Both are responsible for providing general support services, which include technical education, market analysis, business planning and communications, and coordination of sales planning.

Hills Centrally Orders for Entire Chain

NEW YORK – Hills Supermarkets will use a computerized program designed by Cybermark Systems Inc. for central order generation in each of its 68 stores in the New York area.

A 30 per cent increase in sales of health and beauty aids, as well as a significant increase in gross margins, was shown by a test group of stores, according to Eric Waldbaum, Hills vice-president.

"The program opens up substantial opportunities, and we believe we have just scratched the surface of what can be achieved with central order generation," he added.

As a result of this test program, Hills has engaged Cybermark to extend this program to all of its stores covering some ten million dollars of health and beauty aids volume. Extensions of the program to include other categories of merchandise and computerized buying and warehousing control are currently being investigated.

Working Backward

Irwin Sayer, president of Cybermark, stated that, "we can now centrally order for a supermarket. The program responds to consumer purchase patterns in each store at lower cost, increased reliability, and greater management control. We will be working backward from store demand to regulate the flow of merchandise into a warehouse and to control the level of merchandise in that warehouse."

Itemized Measurement

Sayer added, "By measuring each item in each store we can individually merchandise each store. Volume and profit are optimized with better service to the consumer."

Under this new computer program, each store receives a computer printed diagram which serves as both a self layout plan and a return document for inputs of product movement to the computer.

Yes and No

Sayer explained that the store does not order merchandise. Store personnel answer a series of yes and no questions on the diagram (for example, "do you have more than nine of this item"). Each week, questions are asked for only one-third of the items covered.

Based on the store responses to these questions, the computer generates an order and a new diagram which goes back to the store. The store order is not simply a one-for-one replacement for consumer purchases in any given week, but derives additionally from management decisions which instruct the computer to effect a wide range of merchandising treatments among individual stores.

Store Flexibility

The arrival of merchandise and the completion of the diagram are independent activities. Consequently, stores may complete their weekly diagram before, during, or after the time they have packed out their weekly shipment. This creates considerable flexibility at store level and at the shipping point.

The system also automatically adjusts inventory levels by item, based on individually calculated rates of sale, adjusted for overall department size.

The central order generation program includes a broad range of management reports on store turn, inventory, dollars per running foot, selectivity of items, and price elasticity.

Fabri-Tek Charges MIT With Restraint of Trade

MINNEAPOLIS, Minn. – Fabri-Tek, Inc. has filed an antitrust complaint in Federal District Court here, charging MIT with attempted discrimination and restraint of trade.

The suit charges MIT with discriminating in the manner in which it awards licenses under the "Forrester patent" which it holds. The patent is for ferrite core memories, and MIT has, over the years, licensed the patent to various computer manufacturers.

Lump Sum Basis in Past

Fabri-Tek alleges that, in the past, the licensing was done on a cash or lump sum basis. Now, said the company, MIT has decided to award the license on a "lease" or pay-as-you-go basis, resulting in "much higher costs" in the long run.

This change in business practices is discriminating, alleged Fabri-Tek attorneys, who have not set a cost on the company's damages. They seek an injunction to permit acquisition on a lump-sum basis.

MIT would say only that it had licensed the Forrester patent to manufacturers, but refused comment on current business philosophy or other legal aspects of the case.

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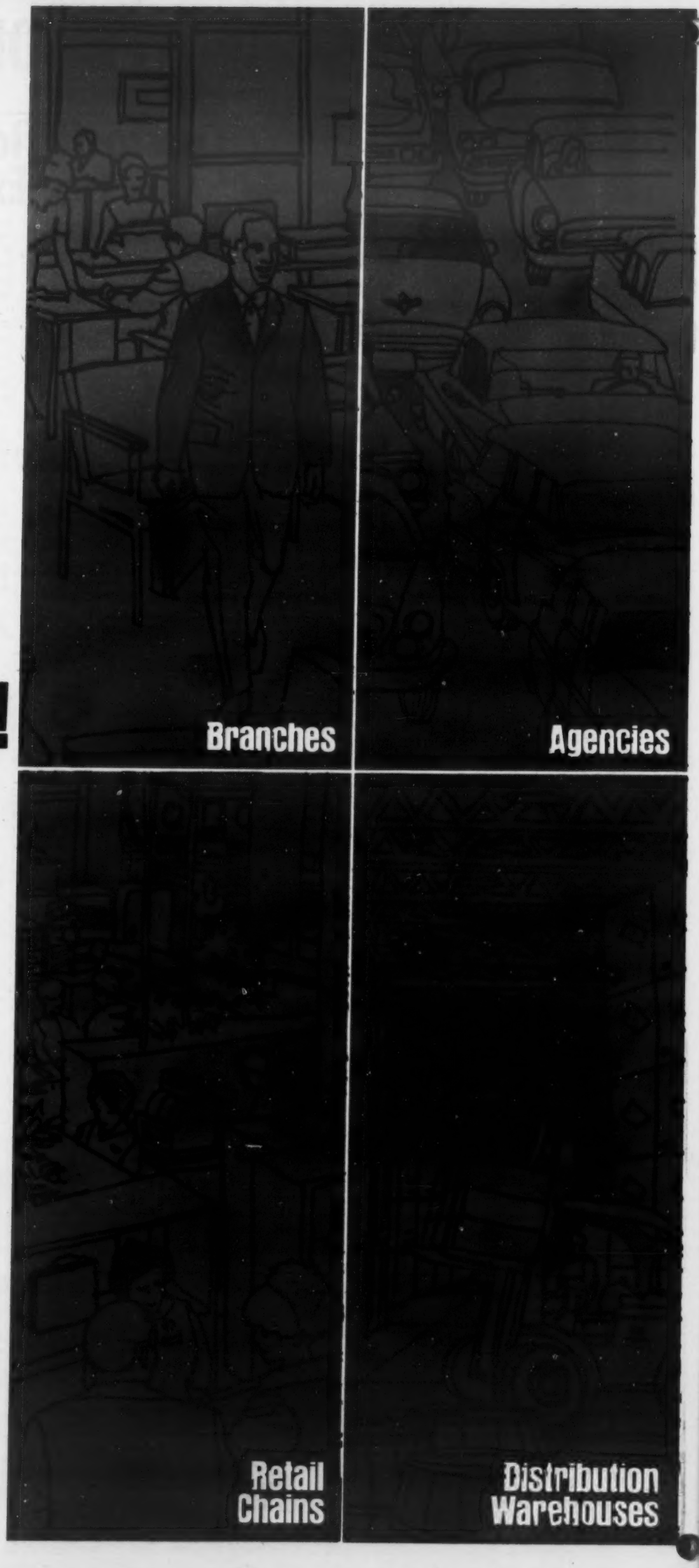

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HUD Municipal Information System Aids Improvement in Community Services

By Harvey Elman
CW Staff Writer

READING, Pa. – A prototype computer-based municipal information system – to assist improvement in community services, minicipal operations, and municipal management – will be developed in Reading, the U.S. Department of Housing and Urban Development (HUD) has announced.

Reading is one of six cities in the country selected for the development of a prototype system. Seventy-nine cities from 30 states submitted proposals to participate in the program with HUD and the Urban Systems Inter-Agency Committee (Usac). Usac is composed of representatives from HUD and the departments of Transportation, Health, Education and Welfare, Labor, Commerce, Justice, Bureau of the Budget, Office of Economic Development, and the Office of Civil Defense, Department of the Army.

Comprehensive planning, on both a citywide and regional basis, will be simplified, since data which is presently scattered among various city bureaus and agencies will be centralized and easily accessible for personnel.

Bureau Operates Computer

The data will be stored in a computer operated by the Bureau of Management Information Systems of Pennsylvania, in Harrisburg. The Reading Bureau will be compatible with other state and regional information systems being developed under the bureau's direction.

Thr Reading system will be totally integrated, with subsystems for public safety, human resources development, public finance, and physical and economic development.

Attention will be focused initially on the physical and economic development subsystem, which involves operations in the areas of the water bureau, land records, engineering, transportation, assessments and parks, and with various permits, including building, electrical, plumbing, health, housing and fire inspection. When the subsystem is completed, Usac will transfer its capabilities to other cities throughout the country.

Systems and Computer Technology Corporation (SCT) of West Chester, Pa., will be the technical project manager and co-system/software contractor for the MIS.

SCT – already under contract to Reading for the development of a Model Cities Information System (Modis) – joined with the city and other contractors in a consortium to gain the HUD award, according to Frederick A. Gross, SCT president.

Three Other Members

Other members of the consortium are the Commonwealth of Pennsylvania, Franklin Institute Research Laboratories, and the Univac Division of Sperry Rand Corp.

SCT is technical manager for the Reading Consortium during the systems analysis and systems conceptualization phases of the project. SCT will also serve as a systems/software contractor, along with Univac.

Under its earlier contract with the city, SCT is aiding in the development of an information system which will give city planners access to data previously collected through attitudinal and demographic surveys in Model Neighborhoods.

According to Leonidas Vastardas, director of the Reading Model Cities Agency, "This information system will support comprehensive planning and evaluation and enable us to plan new programs as well as modify and improve existing ones, first in the Model Neighborhood itself, and eventually throughout the entire city of Reading."

The Model Cities Program is administered by HUD in cooperation with all other federal agencies which administer major urban aid programs. It encourages cities to coordinate and concentrate public and private resources in a locally developed program to deal more effectively with urban problems. The incentive for such action is Model Cities money or supplemental funds from HUD which can be used to implement the programs designed. There is also a promise of coordinated federal response to local needs.

SCT has previously acted as technical manager of other components of Modis, including the fiscal and accounting component which supports program budgeting and financial management, and the internal reporting component which supports the program management and federal reporting to HUD.

Contracts

Davis Computer Systems, Inc., has been awarded a contract to assist in the development of a process computer control system for the olefins plant of El Paso Products, Inc., Odessa, Texas. Under the terms of the contract, DCS personnel will have the responsibility in the development and implementation of the control approach as well as in the computer-systems activities. The agreement calls for DCS to provide over six man-years of systems-engineering services.

Data Products Corp. has received a contract in excess of $1.3 million from the U.S. Naval Ship Systems Command, Washington, D.C.

The contract calls for high-speed militarized line printers to be used in conjunction with military communications systems and operational control systems centers in shipboard and land-based installations.

Comma Corp. has signed a nationwide maintenance service contract with Peripherals General, Inc. Terms of the agreement were not disclosed.

Nars Computer Systems, Inc., Orlando, Fla., has signed a contract with Jefferies Foods Co. to implement an order-entry billing system and other data processing services.

Honeywell Metrology Service has contracted with I/O Systems, Inc. to maintain its line of data handling products on a nationwide basis.

Sanders Associates, Inc. has been awarded a $7,054,000 Navy contract for classified electronic equipment. The contract was processed for the Naval Air Systems Command by the Defense Contract Administration Services Office.

Diablo Systems Inc. has entered into an agreement with Data Recording Instrument Co. Ltd. of Staines, England. Under the terms of the agreement DRI will market the Diablo Series 30 Disk Drive and, under license, manufacture the disk drives in Europe.

Ampex Corp. has received a $450,000 contract from Farrington Manufacturing Co., Springfield, Va., for Model TM-7 magnetic tape drives.

McDonnell Automation Signs Service Contract

ST. LOUIS, Mo. – Under a four-year contract, the McDonnell Automation Co. anticipates cumulative sales of more than $7 million for providing data processing services to Computerized Automotive Reporting Service (Cars), Inc., of Birmingham, Ala.

Cars, Inc., founded in 1964, provides the management of auto agencies with complete accounting reports, parts inventory control, sales analysis, and customer follow-up.

Under the Cars system, automobile dealers all over the U.S. each evening send information on their daily activities to the McDonnell Automation Co. in St. Louis via teletypewriter terminals in their offices.

The data is processed overnight on an on-line computer. The next morning, the computer printout of summary information on a daily and month-to-date basis is in the dealer's office.

Such information includes gross sales, new and used card and truck inventory, finance and insurance income, selling expense, net earnings, and 20 other such items. Weekly or monthly reports are also available.

McDonnell Automation Co. is a division of McDonnell Douglas Corp., a computer service organization.

Trade Shorts

Bit Inc., Natick, Mass., designer and manufacturer of Bit 483 minicomputers, has delivered over $270,000 in equipment this year with more than $4 million on order, said Theodore Sapino, company president.

Honeywell has established a computer education center in Dallas, offering technical and management training programs through the graduate level. Roy L. Henry will direct the facility, called the Honeywell Institute of Information Sciences.

Synergy Information Systems Inc., Rochester, N.Y., has developed an advanced computer forecasting program, stock status report, and economic order quantity (EOQ) program to be sold directly and through software distributors on a national basis.

Honeywell has been licensed by Riker-Maxson Corp., New York, to manufacture lasers under Riker's patent for carbon dioxide laser systems which emit coherent radiation.

Riker-Maxson designs and manufactures electronic systems, components, and communications equipment.

CDC has sold another subsidiary, Microflame Inc. to Electro-Sensors Inc., Minneapolis, for an undisclosed amount of cash. Microflame manufactures miniature hobby and industrial welding torches.

In another CDC transaction, the company's Faribault, Minn., plant will be closed with its operations transferred to the Casper, Wyo., plant. The Faribault site, which employs 123 persons, is engaged primarily in core memory subassemblies for the company's computer production.

Ray Thul, plant manager, cited the present economic situation and continuing softness in the domestic computer market among reasons for the move. Thul said his office was seeking to place as many employees as possible with other firms.

Tymnet, a national computer-communication network which will enable Tymshare subscribers located in any district office area to obtain instant access to the company's National Computer Center in Cupertino, Calif., has been undertaken by Tymshare Inc., Palo Alto.

The new system is now partly operational and is expected to be fully operational by 1971. When completed, it will tie the satellite computer processors in district offices in the U.S. and Canada to Tymshare's centers over a network of Bell Systems lines.

Orders and Installations

Bryant Computer Products, Walled Lake, Mich., received an order of $275,000 from Computer Investments and Leasing Corp. for purchase of Bryant 1100 disk drives. The Bryant 1100 disk drives, which are totally compatible with the IBM 2311, will be interfaced to their Spectra 70/45 computer system for program storage.

The Comsonic Corp., New York, has installed its first Comtest-8 system at Computer Transceiver Systems, Inc. production facility in N.J. Computer Transceiver will use the Comtest-8 for testing and demonstration of its Execuport portable terminals.

A $1.5 million order for a Univac 1106 system was placed by Calculo y Tratamiento de la Informacion, S.A., a Spanish consulting firm. The computer will be used for production control applications.

CBS Television Stations has leased 50 Model 520 keyboard displays and 26 Model 724 control units from Computer Consoles, Inc., Rochester, N.Y. The peripheral equipment will be utilized to support the on-line computer system to assist in management of local television stations owned by CBS in New York City, Los Angeles, Chicago, Philadelphia, and St. Louis.

Pignone Sud ordered a GE-Pac 4020 process computer which will be used for refinery control in Livorno, Italy.

Fully buffered medium-speed line printers in substantial OEM quantities have been ordered by Sangamo Electric Co., Inc., Springfield, Ill., from Data Printer Corp., Cambridge, Mass.

Randalls Group Limited, is installing an NCR Century 100 at its Clarendon Rd., Borehamwood, premises. Sales ledger, purchase ledger, and payroll work will be among the first tasks to be put on the computer, which also will carry out the changeover to decimal accounting for these procedures when the United Kingdom's new currency is fully introduced in 1971.

Telemax Corp., a subsidiary of Wellington Computer Systems Inc. of N.Y., installed a Sanders Model 620 CRT data terminal device at Executive Travel in Detroit. The CRT gives Executive Travel the ability to communicate via high-speed data lines with availability records of hotel-motel and car rentals, enabling the confirmation of reservations in two or three seconds.

Fifth Burroughs Computer Used By Philco-Ford for T/S Network

DETROIT – Philco-Ford Corp. has installed its fifth Burroughs computer, a B5500, in the Philadelphia area, bringing the total value of Burroughs computers at Philco-Ford to more than $4 million.

The B5500 complements three B3500s and a B342 remote processor already installed at Philco-Ford.

The B5500 is part of Philco-Ford's Computer Services Network (CSN), Philadelphia. Louis T. Santoni, CSN market manager, said CSN provides time-sharing services to users in Detroit and in the Philadelphia area.

Philco-Ford utilizes the Burroughs equipment for DP services in inventory control, payroll, industrial relations, engineering, and financial reports.

A Burroughs B342 remote processor is installed at Philco-Ford's plant in Watsontown, Pa., which manufactures television and stereo cabinets. The B342 communicates on-line with the B3500 at the corporate office.

A second B3500, installed at the Philco-Ford facility in Philadelphia, is used for batch processing and remote computing with teletypewriters.

A third B3500 was recently installed at Philco-Ford's refrigeration products plant in Connersville, Ind., for batch processing.

Computer Aids Frank Leahy

CHICAGO – A computer search of 8,500 names found two pints of rare blood for former Notre Dame football coach Frank Leahy.

The computer at the American Association of Blood Banks rare donor file found the two pints in Minneapolis.

UCC, Intranet Agree On Joint Marketing Of 1108 Software

LOS ANGELES – Intranet Computing Corp., Los Angeles, and University Computing Co., (UCC) Dallas, have entered into an agreement under which UCC will market Intranet's proprietary software to lessees of Univac 1108 computers from UCC.

E.W. McCain, executive vice-president of UCC, and Arthur E. Speckhard, president of Intranet, said the joint marketing agreement will enable UCC's Computer Leasing Division to lease used 1108s at "extremely favorable" rates. The division is a major lessor of 1108s to other companies.

"This agreement markedly enlarges the number of potential new users for 1108s which may return to us from original lessees," McCain said.

The software package is identical to that which Intranet uses to provide time-sharing services to its clients nationwide.

Response Oriented

The Intranet software differs from other 1108 software in that it is response oriented – that is, designed for users requiring access to a large-scale, third generation computer primarily through low-speed, interactive terminals. The system is designed to support more than 100 terminals simultaneously.

The Intranet software also incorporates a variety of interactive processors, including an extended Super-Basic, and a full Fortran V conversational system.

Users of the Intranet software will pay a monthly fee to Intranet in addition to the monthly lease rate paid to UCC for the computer.

Through UCC, Intranet will also market its peripheral communications equipment to lessees of UCC 1108s. This equipment includes the TAU6213, a terminal access unit which serves as the interface between low-speed interactive terminals and the Univac 1108.

Acquisitions

Wellington Computer Systems Inc., New York, computer consultants, has acquired 100% of the stock of **Telemax Corp.**, an automated reservation system serving the travel industry, from Riker-Maxson Corp. Telemax will be headquartered in New York while the Telemax Computer Center will continue to be located in Fairfield, N.J. Wellington has designed and installed complex communications systems, developed special purpose computer languages, and conducted client studies in order to determine system requirements, manpower needs, hardware evaluation, throughput requirements and many other factors. In the software development area, Wellington has designed and programmed a variety of computer systems it markets and supports as complete packages within particular industries, such as banking and manufacturing.

University Computing Co., Dallas, a computer utility services firm, has agreed in principle to purchase the assets and business of the **Systems and Services Division** of Micromation Technology Corp., Chicago, for a total consideration of $750,000. Systems and Services operates three COM service centers.

Computer Sharing, Inc., Bala Cynwyd, Pa., a subsidiary of Scientific Resources Corp., and **Data Network Corp.**, New York, have reached an agreement in principle for a merger of the two corporations, each of which is engaged in providing computer time-sharing facilities and services. It is presently contemplated that each share of common stock of Computer Sharing would become one share of common stock of the merged corporation, and each share of common stock of Data Network would become about 1.5 shares of common stock of the merged corporation.

Univac Opens Cleveland Office, Expands Manufacturing Facility

CLEVELAND – Univac has opened a new industrial sales office here and has expanded a manufacturing facility in Strasburg, Pa.

The Cleveland industrial products office at 3645 Warrensville Center Road in Shaker Heights will cover the Kentucky, Ohio, Indiana, and Michigan areas. The industrial products department handles all sales of Univac equipment to original equipment manufactures, for incorporation into its own product line. Cleveland is its sixth new sales office in the past two years.

The Strasburg facility presently has about 11,000 sq ft and will be enlarged by 7,000 sq ft to provide more offices. Located on a 20-acre lot, the Strasburg facility was acquired by Univac in the fall of 1968 for the production of precision computer components. The facility is administered by the Philadelphia product operations department of the Univac Data Processing Division, the company's commercial production arm.

Other Expansions

Service Associates Inc. opened a New York area office at 12 Potter Ave., New Rochelle, N.Y. This office will provide repair and preventive maintenance service by contract or demand on teletypes, computer terminals, peripherals, and small digital electronic equipment, and will implement manufacturers' warranties.

Modular construction techniques and critical path scheduling have been developed by Computer Preparations, Inc. to complete a computer site installation in Englewood Cliffs, N.J. Special electrical, air conditioning, and construction subassemblies have been modularized. Computer Preparations, Inc. has made more than 300 data processing installations to date.

Computer Synectics, Inc., developer and manufacturer of equipment for measuring computer performance, has announced the mid-April opening of a regional sales office for the New York and Chicago areas. The New York area office will be at 34 South Broadway, Suite 206, White Plains, N.Y. The Chicago area office will be at 2500 Devon Ave., Des Plaines, Ill.

Hygain Technologies Handles Universities' Computer Products

WESTPORT, Conn. – Hygain Technologies, Inc. is a new firm which manages computer-related products developed by universities.

Initially, the firm will specialize in the packaging, marketing, and installation of campus-developed computer programs. These programs will be system type programs designed for use on medium- to large-scale IBM computers.

Hygain's first two products, Systel and Sysmac, were developed by an Ivy League university. Systel provides a time-sharing capability for 360 systems. Sysmac provides management control over the complex multiprogramming operations of OS/360.

New Companies

Other New Companies

• Electronic Marketing Specialists, a manufacturer's representative firm, was recently formed with offices in California's three major cities. The firm is directed toward the sale of products in the computer peripheral and OEM markets.

The five officers of this new company previously held key sales and managerial positions with Ward/Davis Associates.

• Computer Logic Systems, Inc., has been founded with corporate headquarters in North Billerica, Mass.

The company's initial product is a general purpose minicomputer, an 18-bit machine with 15 hardware registers, priced to sell to original equipment manufacturers for $7,500

The CLS-18 is the first minicomputer with fully usable multiaccumulator architecture.

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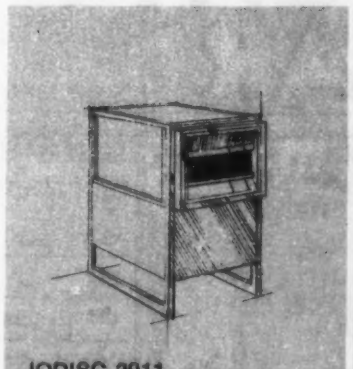
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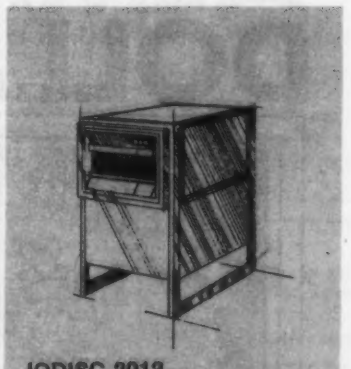
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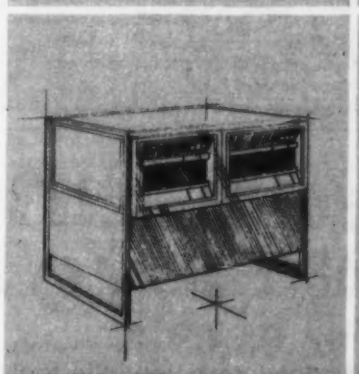
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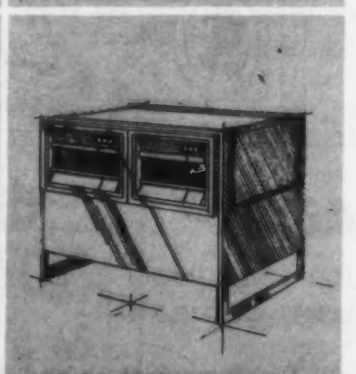
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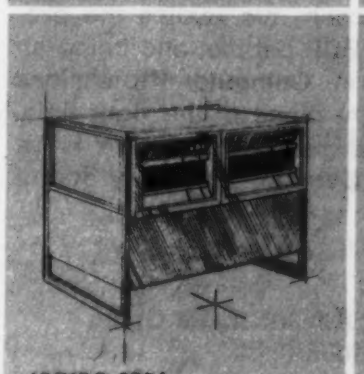
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Position Announcements

Raymond J. Noorda Named VP, Planning Head at GA

SANTA CLARA, Calif. – Raymond J. Noorda has been named vice-president and director of planning for General Automation, Inc.

Noorda joins General Automation after a 21-year association with GE. During the past 17 years with GE, Noorda has specialized in the development of computer-based systems for automated manufacturing and other industrial applications.

At General Automation, Noorda will direct the company's product planning and market research groups in determining specific needs for computer-based systems in manufacturing and other industries.

From 1963 to 1968, Noorda served as manager of industrial sales and applications for GE's process computer dept., a unit of the company's Process Measurement and Control Division.

Noorda subsequently was named general manager of GE's manufacturing automation systems operation where he was responsible for developing new business in the areas of numerically controlled manufacturing, automatic testing, and production reporting.

Noorda graduated from the University of Utah with a B.S. degree in electrical engineering. He later completed GE's three-year advanced engineering program at the company's Schenectady, N.Y., facilities.

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Ronald Freeman Named to Head Informatics Unit

SHERMAN OAKS, Calif. – Ronald S. Freeman has been appointed president of Informatics/Management Computer Services, a wholly owned subsidiary of Informatics Inc.

Freeman, who was most recently president of the Data Station Corp., has over 14 years experience in the computer field. He received his B.A. degree in sociology from UCLA and joined IBM in 1957. When he left IBM in 1967 to organize the Data Station Corp., he was marketing manager for education for the government, education, and medical region.

Executive Corner

Decision Data Corp. Elects Finance VP

PHILADELPHIA, Pa. – Howard Bernard, former Univac contracts manager, has been elected vice-president of finance at Decision Data Corp., Warminster-based computer equipment manufacturer.

Bernard, a certified public accountant and attorney licensed in New Jersey and Pa., served as Univac contracts manager for three years.

Other Moves

■ David B. Levi has been elected to vice-president of finance and administration of Information Services, Inc., and Michael J. Fields has joined the company as vice-president of marketing.

■ Computer Business Consultants, Inc., has promoted William R. Snyder to president. Snyder was formerly executive vice-president of the firm and previously vice-president of the Midwest Stock Exchange Service Corp.

■ G. Charles Cole has been named vice-president, finance and treasurer of Electronic Graphics, Inc.

■ Edgar L. Van Cott has been named vice-president for engineering and manufacturing at Devonshire Computer Corp., Newton, Mass. He is responsible for design and production of the firm's communications computers.

■ Gilbert Guy Moser has joined Computer Learning and Systems Corp. as vice-president and general manager.

■ Frank A. Kirby has joined Optical Scanning Corp. as vice-president of marketing.

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Xerox Suit Seeks to Halt Marketing of New IBM Copier

NEW YORK – Xerox Corp. has filed suit in the U.S. District Court for Southern New York seeking unspecified damages from IBM and an injunction to prevent the computer industry giant from marketing a "xerographic" copier.

IBM announced the copier last Wednesday, which rumor had long predicted [CW, April 22]. The copier is similar to Xerox's, but uses a roll of paper rather than individual sheets. The price and marketing structure are very close to Xerox's as well.

The suit alleges that IBM is infringing on 22 Xerox patents covering xerography, and asserts that IBM had approached Xerox in 1968 and 1970 for licenses to use these patents in an office copier. Xerox refused both times.

However, Xerox has licensed IBM to uses xerography in computer equipment. Xerox's suit contends that IBM is using "data, knowhow, and trade secret information" it got from Xerox under this arrangement in its office copier.

Reviewed Patents

IBM replied that "in developing the copier, IBM made a very careful review of the patents held by Xerox," and that the copier "does not infringe any valid Xerox patent or use any Xerox confidential information." Saying that the other charges were "without foundation," IBM promised to "defend the suit will all its resources."

In response to Xerox's claim, an IBM spokesman said:

"IBM has on several occasions had discussions with Xerox concerning the licensing of Xerox patents in the office copier field. Xerox had consistently refused such a license for machines with a plain paper output.

"The discussions held in recent years have always been with the clear understanding that IBM felt it didn't require a license from Xerox to market the IBM copier, but it was interested in a non-exclusive cross-licensing between the companies to avoid wasteful litigation."

He also noted that IBM does not make any computer related equipment using xerography.

Depending on the contract involved, Xerox copiers are cheaper for a user of less than 8,000 copies a month. The IBM machine offers a decrementing copy control, no warm-up time, toner in a cartridge, and a unit that is smaller than Xerox's. The IBM copier price structure is arranged to prevent outright sales and preserve rental arrangements.

There is a possibility, if Xerox fails to obtain its injunction, that price competition between the two may develop. Both companies, however, are happy with their wide profit margins, and it will be interesting to see if they fall to the level of warring gas stations. And if they do, it would be quite a boon to office managers across the country.

The IBM unit rents for $200 a month, with a 2.3 cent charge per page. The Xerox 720 goes for $175 a month, but costs 4 cents a copy. In addition, the paper rolls (625 sheet/roll, 4 roll/carton) cost from $18 per carton in lots of one or two, to $10.75 per carton in freightcar loads.

Viatron Subcontracts 2 Plants to Assemble System 21 Terminals, Negotiates in Japan

BURLINGTON, Mass. – Viatron Computer Systems is departing from its former policy of self-reliant manufacturing by wrapping up negotiations with Amphenol and Hazeltine Corps. to build System 21s.

A Viatron spokesman described the company's new policy of subcontracting as dependent on confidence in suppliers. As production of segments of the system becomes more and more routine, greater amounts will be subcontracted, up through and including final assembly.

Production at the Burlington plant will be restricted "to a maximum of 1,000 units a month in order to reduce overhead expenses and permit retention of the current price structure."

In addition, the company is completing new facilities in Indianapolis and Hong Kong, that should be producing units by mid-year, according to Viatron. Negotiations for a facility in Japan are in process as well.

Viatron also announced first quarter sales of $194,000 and a loss of $2,943,000, compared with sales of $94,000 and a loss of $906,000 for the first quarter of the last fiscal year. The loss for the fourth quarter of fiscal 1969 was $4,500,000.

At the shareholders meeting recently, Viatron owners were asked to approve a five-fold increase in authorized common stock.

The avowed purpose of the increase is acquisitions, although a Viatron officer said that there are "no formal negotiations" taking place right now. He did add that Viatron will be "much more aggressive in the coming year" regarding acquisitions.

With two subsidiaries under its belt already – Photics and Viatron Programming Institute – Viatron also has an unused but authorized class of preferred stock in its armory. Potential purchases would be "vertical" in nature, concerned with computers and not "profitable shoe factories."

Viatron has also just introduced a line of inexpensive optical readers using a special Viatron font. A prototype will be exhibited at the Spring Joint Computer Conference.

A New Family of Marketable Computers Might Solve Control Data's Problems

By Michael Merritt
CW Staff Writer

MINNEAPOLIS – While Burroughs, Honeywell, and IBM are turning in quarterly reports ranging from handsome to sparkling, Control Data Corp. is suffering through a long, cold winter.

The latest evidence of CDC's troubles is a major restructuring of top executive responsibility. "Top management responsibilities" will be shared by a four-man committee, comprised of William R. Norris, who will remain president and board chairman of the company; William R. Keye, who serves as chairman of the committee and remains corporate executive vice-president, operations; Harold H. Hammer, former vice-president, finance; and R.D. Schmidt, former senior vice-president, marketing. Hammer and Schmidt retain their vice-presidential status, but in an "at-large" capacity.

Four Areas

In addition, the company is also combining its marketing and production operations into four areas, each headed by a vice-president and group executive. The four areas are EDP products, EDP systems, marketing, and services.

The significance of these moves is still unclear, Control Data is an odd company in the computer field since its product line of large computer systems is designed more for scientific and research use than for the file management use more desirable in commercial machines.

This has meant that CDC's customer mix had a much higher percentage of educational, aerospace, and government users than IBM, for example. Government spending cutbacks, besides limiting direct orders to CDC, have decreased research grants and stretched out aerospace programs, so that CDC, even indirectly, is a double victim.

And, undeniably, CDC has been hurt. It closed the last fiscal year with profits from computer operations at best stalled, and the company has predicted that first quarter earnings will be "substantially below" 1969's due to a "substantial" loss in computer activities.

The company notified its 37,000 employees at the beginning of the year that there would be practically no new capital expenditures and all budgets would be under review. So far this year CDC has closed several small plants and layed off several hundred employees.

(Continued on Page 107)

Boothe Merger Off, L-T Seeks New Deal

NEW YORK – Failing in its efforts to merge with Boothe Computer, Levin-Townsend Computer Corp. is negotiating with an unnamed party to sell $50 million of computer equipment.

After taking a $15.9 million loss from write-offs last quarter, Levin-Townsend discovered it couldn't meet payments on an $11.2 million debt to IBM. Since that time, Levin-Townsend has been scrambling to find new financing.

The company's announcement said only that it was negotiating the sale, which would include assignment of leases. The buyer would assume part of Levin-Townsend's debt to IBM, and pay off a substantial amount of it immediately.

IBM, which has extended the deadline on the debt since the middle of February, said that it would accept the plan.

Meanwhile, Boothe Computer disclosed that merger negotiations between the two leasing companies had been broken off. The merger, which has been under discussion since the beginning of the month, would have created the largest leasing company in the U.S.

An industry source indicated the buyer of Levin-Townsend's equipment would not be Boothe.

Automatic Data Processing Earnings Up 42%, Revenues 36%

CLIFTON, N.J. – Automatic Data Processing, Inc. (ADP), a national computer services firm, has reported record revenues and earnings for the nine months ended March 31, 1970.

Frank R. Lautenberg, president, said net earnings rose 42% to $1,985,131 or 40 cents a share from $1,402,016 or 29 cents per share a year ago. Operating revenues increased 36% to $26,958,064 from $19,891,451. Pretax earnings rose to $4,331,631 from $3,074,716.

Despite lower than expected earnings from ADP's stock brokerage DP operations, sales of the company's payroll and other commercial DP services continued at record rates from ADP's network of computer centers around the country, Lautenberg said.

During the past quarter, ADP completed its acquisition of Electronic Data Service, Inc., a Chicago-based computer services firm, and Data-Way Corp., a Westbury, L.I. computer services firm.

ADP is a payroll specialist, with computer centers in major metropolitan areas. This most recent acquisition announcement is part of the company's continuing expansion program.

The Data-Way and Electronic Data Service acquisitions are the fourth and fifth made by ADP in the current fiscal year and bring to 15 the total in less than three years.

French Hardware, Software Firms to Merge

PARIS – France's largest manufacturer of computer systems and its largest software house are going to merge.

The hardware maker, Compagnie Internationale pour l'Informatique (CII), will absorb Compagnie de Systems et Peripheriques Associes aux Calculateurs (Sperac), which should speed up the French government's "Plan Calcul" for production of medium and small business and scientific computers.

CII, as the surviving company, will have 5,000 employees and annual sales of about $20 million after the merger.

Local Development

The Plan Calcul is an effort to develop a local computer industry capable of competing with the American industry. Of the 22,000 computers currently installed for general purpose DP in Europe, about 67% are of American origin.

Last December, France submitted a plan to the six-nation Common Market for creation of a European computer industry to vie with the U.S.

The CII-Sperac merger was the result of complex maneuvering. The first step came last fall when the Societe Thomson-Houston-Brandt and Compagnie Generale d'Electricite formed a holding company called Societe Financiere pour l'Informatique (Fininfor).

Earnings Reports

DIGITECK CORP.

Three Months Ended Feb. 28

	1970	g1969
aShr Ernd	.....	$.05
Revenue	$449,652	1,616,303
cSpec Items	154,114	d14,309
eEarnings	73,262	27,128
a9 Mo Shr	.....	.14
Revenue	1,360,802	1,781,302
cSpec Items	116,528	d3,801
Loss	97,829	f123,067

a-Based on income before special items. c-Reflects gain on sale of subsidiary in 1970 and loss on sale of subsidiary in 1969. d-Loss. e-Equal to eight cents a share in 1970 and three cents a share in 1969. f-Income; equal to 14 cents a share. g-Restated to exclude results of subsidiaries subsequently sold.

COMPUTEST CORP.

Three Months Ended Feb. 28

	1970	1969
Shr Ernd	$.30	$.09
Revenue	3,693,123	2,023,997
Earnings	283,580	78,108
9 Mo Shr	.62	.30
Revenue	8,229,314	4,709,598
Earnings	580,278	276,795

IBM

Three Months Ended Mar. 31

	1970	1969
Shr Ernd	$2.02	$1.82
Rev	1,720,810,543	1,684,718,577
Earnings	230,261,417	205,960,914

GENERAL AUTOMATION INC.

Six Months Ended Jan. 31

	1970	1969
Revenue	$2,713,000	$622,000
Loss	1,060,000	269,000

ELECTRONIC COMP. PROG. INST.

Year Ended Dec. 31

	1969	1968
Shr Ernd	.....	a$.39
Revenue	$3,265,865	3,481,113
Spec Chg	b183,662	c108,515
Loss	232,215	e403,691

a-Based on income before special credit. b-As a result of decisions to terminate the Blake Drafting School program, and a pilot body conditioning salon project, as well as to curtail the Automated Personnel International Inc. program. c-Credit; from sale of a division that was discontinued. e-Income; equal to 53 cents a share.

BRADFORD COMPUTER & SYS.

Three Months Ended Mar. 31

	1970	1969
aShr Ernd	$.17	$.06
Revenue	1,962,210	732,364
Earnings	262,618	78,366

a-On a fully diluted basis.

COMMUNICATIONS SATELLITE

Three Months Ended Mar. 31

	1970	1969
Shr Ernd	$.33	$.15
Revenue	15,435,000	10,222,000
Earnings	3,345,000	1,525,000

COMPUTER TECHNOLOGY INC.

Three Months Ended Mar. 31

	1970	a1969
Shr Ernd	....	$.07
Revenue	$9,687,000	7,395,000
Loss	667,000	b392,000

a-Restated to exclude results of a subsidiary which was sold. b-Income.

AUTOMATIC DATA PROCESSING

Nine Months Ended Mar. 31

	1970	a1969
Shr Ernd	$.40	b$.29
Revenue	26,958,064	19,891,451
Earnings	1,985,131	1,402,016

a-Adusted to reflect acquisitions on a pooling-of-interests basis. b-Adjusted to reflect three-for-one stock split in Dec. 1969.

DATA DOCUMENTS INC.

Six Months Ended Mar. 31

	1970	1969
aShr Ernd	$.96	$.85
Revenue	12,151,032	10,252,936
Spec Cred	.....	b29,319
Earnings	448,906	c425,851

a-Based on income before special credit. b-From operating loss carryforward. c-Equal to 92 cents a share.

HONEYWELL INC.

Three Months Ended Mar. 31

	1970	1969
Shr Ernd	$.90	$.80
Rev	365,000,000	325,000,000
Earnings	13,900,000	11,900,000

VARIAN ASSOCIATES

Six Months Ended April 3

	1970	a1969
Shr Ernd	$.41	b$.37
Revenue	95,559,000	90,853,000
Earnings	2,836,000	c3,871,000
Spec Cred	.....	e1,250,000

a-Restated to include results of Pulse Engineering. b-Based on income before special credit. c-Equal to 56 cents a share. c-Includes gains of $1 million from sale of Cupertino facility and $250,000 from sale of equity interest in Thomson-Varian S.A.

DATA-CONTROL SYSTEMS

Six Months Ended Mar. 27

	1970	1969
Shr Ernd	.....	$.06
Revenue	$2,928,173	3,679,500
Loss	592,991	a50,881

a-Income.

DIGITAL EQUIPMENT CORP.

Three Months Ended Mar. 28

	1970	a1969
Shr Ernd	$.43	b$.24
Revenue	36,200,000	23,442,000
Earnings	4,075,000	2,182,700
9 Mo Shr	$1.01	b.63
Revenue	97,000,000	60,984,000
Earnings	10,364,000	5,644,000

a-Restated. b-Adjusted to reflect three-for-one stock split in May 1969.

BARRY WRIGHT CORP.

Three Months Ended Mar. 31

	1970	1969
Shr Ernd	$.17	a$.29
Revenue	7,575,210	b7,832,957
Spec Cred	.....	c728,000
Earnings	296,241	e1,125,419

a-From continuing operations. b-Sales from continuing operations. c-Principally from stock investment in Certron Corp. e-Equal to 65 cents a share.

PROGRAMMED PROPRIETARY SYS.

Nine Months Ended Feb. 28

	1970	1969
aShr Ernd	$.18	$.01
Revenue	2,109,000	135,500
Earnings	262,000	16,200

a-Adjusted for a three-for-two stock split in March 1970.

COMPUTER INSTRUMENTS CORP.

Year Ended Dec. 31

	1969	1968
Shr Ernd	.....	$.13
Revenue	6,843,390	7,538,795
Loss	292,426	a203,773

a-Income.

BURROUGHS CORP.

Three Months Ended Mar. 31

	1970	1969
Shr Ernd	$.56	$.46
Revenue	189,175,000	163,075,000
Earnings	9,708,000	7,607,000

NATIONAL CASH REGISTER

Three Months Ended March 31

	1970	b1969
aShr Ernd	$.76	$.61
Revenue	305,077,000	264,761,000
Earnings	8,149,000	6,516,000

a-Per share earnings based on the average number of shares outstanding in the periods assuming full dilution. b-Restated to include the results of Combined Paper Mills, Inc., which NCR acquired in July 1969.

XEROX CORP.

Three Months Ended Mar. 31

	a1970	a1969
Shr Ernd	$.59	b$.50
Revenue	402,600,000	338,800,000
Earnings	46,000,000	38,400,000

a-Consolidates the operations of Rank Xerox Ltd., for the three months ended Jan. 31, 1970. The 1969 year has also been restated to include Xerox Data Systems. b-Adjusted for a three-for-one stock split in May 1969.

Marketable Computers Might Solve CDC's Problems

(Continued from Page 105)

Control Data officers have "laid the blame for this situation on reduced shipments of large systems in the U.S., which in turn was due to the uncertain economic outlook, government cutbacks, and inflation.

Granted, Burroughs, Honeywell, IBM, and RCA are not as tightly locked to the federal budget as CDC, but that doesn't explain all of the gap between them.

One of the ominous clouds on CDC's horizon is the statement that "some major programs will be canceled and some delayed."

CDC's bread and butter line of computers dates from 1964 when the 3600 was announced and late 1965 when the 6600 was first delivered. The 6700 and 7600 are recent developments, but CDC has discovered that you can't make much of a living selling $8 million machines – at least not right now.

One of the most promising solutions to CDC's problems would seem to be a new family of computers, a family that is marketable, a family of business rather than scientific machines.

The arguments about CDC's software are long and longstanding; one thing, though,, is certain. Buyers of commercial computers are much more sophisticated in their software demands, and will not accept CDC's usual software approach, which is once again attuned to a scientific user who wants to write his own programs.

CDC is certainly capable of designing and building a computer oriented toward file management. If it can combine this ability with file-oriented software, it could well have a way out of its sales woes, for CDC hardware is very well respected.

A Solution?

However, this is just the sort of solution CDC seems to be ruling out. Such a move would require new capital outlays; CDC is holding back on just that. The only new computer that may be in the immediate offing is the Star, a super number cruncher.

This is just the direction that has brought CDC into its present difficulties – larger and larger machines, smaller and smaller markets.

The management realignment does bring CDC in tune with current executive suite usage, and bringing all marketing forces under one roof may be a wise move.

And marketing orientation is what CDC needs. The ready source of capital in Commercial Credit will be able to keep the company floating for a long time.

But if CDC wishes to remain a leader in the computer field, if it wants its stock given the multiple on Wall Street reserved for exuberant growth, and if it would rather be a computer company with a financing subsidiary, it will have to begin paying attention to marketing.

New Registrations

DIGI-LOG SYSTEMS, INC., 107 West Ridge Pike, Conshohocken, Pa. 19428, a company engaged in the design, manufacture, and marketing of small hybrid computer systems and computer peripheral equipment for commercial and governmental users, filed to register 150,000 shares of common stock. Proceeds, at $4 per share, intended for engineering and design of production manufacturing equipment, for research and product development, and to establish and conduct a marketing and sales program; the balance will be added to the company's working capital and used for general corporate purposes. The underwriter is Patterson, Matzkin & Co., Inc., 170 Route 35, Red Bank, N.J.

COMPUTER HOLDINGS, INC., 60 East 42nd St., New York, N.Y. 10017, a company engaged in a variety of businesses with emphasis in the computer hardware and software and personnel training and placement industries, filed to register 66,960 shares of common stock. Proceeds are intended to be used in connection with the acquisition of Estey Schools, Inc. and two other firms engaged in personnel training and placement, and the balance will be added to the company's working capital and used for general corporate purposes, including acquisitions. The underwriter is Nagler, Weissman & Co., Inc., 462 E. Tremont Ave., Bronx 57, N.Y.

SCAN-DATA CORP., 800 East Main St., Norristown, Pa., a company engaged in the design, development, manufacture, and marketing of a line of optical scanning systems which are intended to facilitate input to DP systems, filed to register 200,000 shares of common stock. Proceeds, at $35 per share maximum, intended for connection with financing contemplated leasing of its products, and a portion applied to payment of short-term indebtedness; the balance will be added to the company's working capital and used for general corporate purposes. The underwriter is G.H. Walker & Co. Inc., 45 Wall St., New York, N.Y.

DATUM INC., 170 East Liberty Ave., Anaheim, Calif., a company engaged in the design, manufacture, and marketing of electronic and electro-mechanical devices and systems, including the development, production and sale of peripheral equipment and related products for the computer industry, filed to register 350,000 shares of common stock. Proceeds, at $7 per share maximum, intended to retire bank loans, to acquire by purchase or lease and to install improvements in a facility in Orange County, Calif., to increase parts inventory, for research and development, and for working capital for the newly established California Peripherals Division. The balance will be added to the company's working capital and used for general corporate purposes. The underwriter is Great Pacific Securities Corp., 1621 East 17th St., Santa Ana, Calif.

FACTSYSTEM, INC., 612 North Michigan Ave., Chicago, Ill. 60611, a company organized in Oct. 1967 to complete the development of and market a management information system for recently developed electronic data processing equipment and to provide DP services and computer personnel training in connection with the use of its system, filed to register 190,459 shares of common stock, and $2,500,000 of convertible subordinated debentures, due 1990. Proceeds, at $10 per share maximum, and proceeds from the sale of its debentures, intended to retire short-term indebtedness incurred to finance operational and developmental costs; the balance will be added to the company's working capital and used for general corporate purposes. The underwriter is Alessandrini & Co., Inc., 11 Broadway, New York, N.Y.

CLARY DATA COMP SYSTEMS, INC., 404 Junipero Serra Dr., San Gabriel, Calif., a company organized for the purpose of acquiring the business conducted by Clary Corp.'s Computer Division, and engaged in the manufacture and sale of a digital computer, computer peripheral equipment, and a computer terminal product, filed to register 250,000 shares of common stock. Proceeds, at $14 per share maximum, intended to retire short-term debt incurred to obtain working capital, for the continuation of research and development programs, for expansion of the company's marketing program, for parts and materials to increase inventories and for capital improvements; the balance will be added to the company's working capital and used for general corporate purposes. The underwriter is Birr, Wilson & Co., Inc., 155 Sansome St., San Francisco, Calif.

DiComes on Stocks

Burroughs' Past Projects Strong Future

It is small comfort to be able to say, "I told you so!" But by the same token, comfort is felt in finding other savants, more knowing than we, who confirm our guesses. This, then, is my present feeling when I read the daily papers, business magazines, and various trade journals.

On March 23 of this year, I assumed a market turn was imminent. Although the activity of the week ended April 17 shows another 10 point loss in the Dow-Jones Averages, encouragement in my convictions becomes easier when I see my peers forecasting "market-bottom at hand," "turn in cycles obvious," "slowdowns and slumps disappearing."

At the basis of all guesses are certain truths, which, though violated by outside influences, still remain.

Just as, once again, computer stocks garnered 30% of the New York Stock Exchange's most active list, so must we accept the fact that of all the glamour industries unleashed on Wall Street, the computer is here to stay.

Surely we sympathize with Levin-Townsend who gambled in Las Vegas and lost, but so must we look at venerable Singer Company – now entering the computer field with its System 10.

Now, with the Dow-Jones at 775.94 (down from 785.90 a week ago), I suggest becoming an agggressive buyer of issues in the field – like Burroughs, Digital Equipment, and Wang.

When a company can continue to show profit increases in the 20% range consistently since 1964, it bears examination. Burroughs Corp. had earnings in 1969 of about $759 million, up from 1968's $651 million; share earnings in 1969 emerged at $3.32 versus 1968's $2.64.

A rising order backlog (B6500 computers and TC500 and other terminal devices comprising the bulk) is pointing to record earnings again this year.

Series N and Series S peripheral devices add to this total. With this increased volume of sales, profit margins are widening substantially. The absence of depreciation charges and a lower interest cost should frame a very handsome profit picture.

The backlog of newly introduced B6500 computers (with time-sharing applications) sits at well over $300 million with sales prices ranging from $2 to $15 million.

> Robert DiComes comments on the stock market for CW from time to time. Educated at Harvard, DiComes is a retired broker who spends his time managing his stock and real estate portfolios, and a farm in New Hampshire.

"In the past year orders for EDP equipment rose 38%. Recently, CompuTerminal Corp. (privately owned) ordered 40 or its B5500 dual process computers for more than $60 million. The *Wall Street Journal* recorded this as "the largest single purchase of computers ever made within private industry."

With Burroughs doing a large rental volume, the company has protected itself from economic relapses such as the one we now hope to be ending. Researchers predict earnings this year at about 25% higher than 1969's $3.32, or roughly $4.15 to $4.25 a share.

CompuTerminal's deal with Burroughs leaves openings for another $60 million in sales of remote terminals. With $12 million down and the balance over a seven-year period, Burroughs delivery of the computers over the next two and a half years should prove a good earnings base.

The announcement last month by the company of a new series of medium to large computers now fills the gap between the B3500 and B5500 and B6500 units.

President Raymond W. Macdonald at the recent annual meeting conservatively expected earnings increases of 15% this year. He further estimated that EDP systems sales values would be between $500 and $600 million versus 1969's $398 million.

At the same time, the company announced the development of a new electronic disk file memory system to be used with its large-scale B6500 computer systems. Burroughs says these systems store and retrieve information 10 to 20 times faster than units currently made by Burroughs and others.

Shipments of the new system will begin in the fourth quarter of this year. The unit, called disk-file optimizer, will sell for about $135,000 or lease for about $3,000/mo.

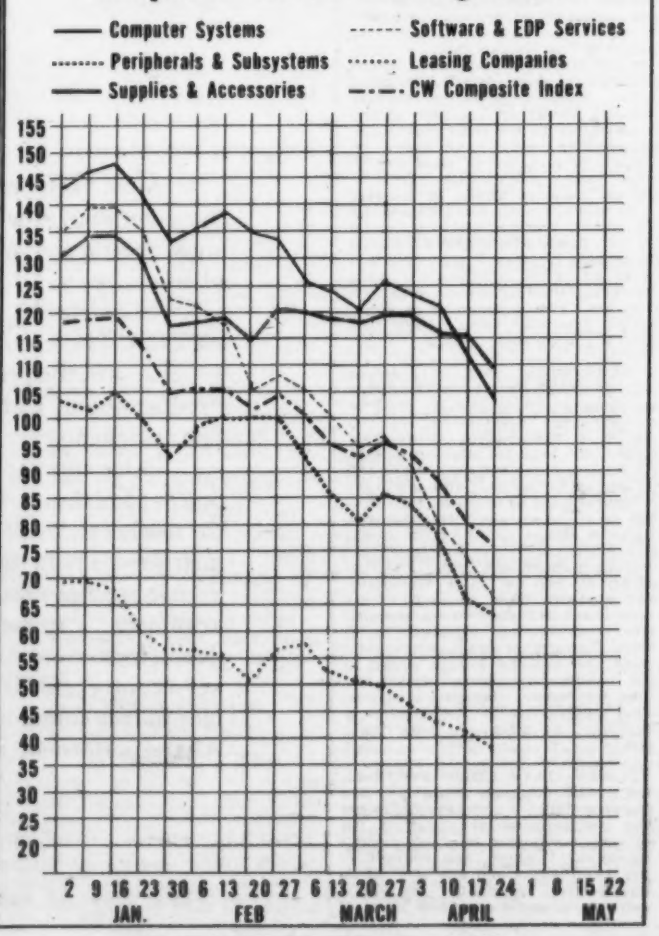
With all this going for a company, we must say BUY Burroughs in its present range of $132 to $140 a share and HOLD it!

Itel 1st Quarter Earnings Up

SAN FRANCISCO – Revenues of Itel Corp. for the quarter ended March 31, 1970 increased to $12,447,000 from $7,367,000 a year earlier, and net income after federal tax provisions rose to $748,000, as compared with $649,000 a year ago.

Primary per-share earnings were up to 19 cents in the March quarter, as against 17 cents a year ago, according to Itel President Peter S. Redfield.

Computer Stocks Trading Index



BASE FOR EACH TRADING INDEX: 100 as of 3/1/68

Computerworld Stock Trading Summary

NEW YORK AND AMERICAN STOCK EXCHANGE CLOSING PRICES, FRIDAY, APRIL 24; OVER THE COUNTER AND NATIONAL STOCK EXCHANGE, THURSDAY, APRIL 23

SUPPLIES & ACCESSORIES

EXCH	1970 RANGE	CLOSING PRICE			WEEK NET CHANGE	WEEK % CHANGE
O	46- 35	---		ACME VISIBLE	---	----
N	15- 10	11	1/4	ADAMS-MILLIS CORP	+ 3/8	+ 3.45
O	21- 16	16		BALTIMORE BUS FORM	---	----
A	25- 10	10	3/4	BARRY WRIGHT	- 1	- 8.51
A	35- 23	23	1/4	DATA DOCUMENTS	- 2	- 7.92
N	19- 14	15	1/4	ENNIS BUS. FORMS	- 5/8	- 3.94
N	166- 93	93	1/4	MEMOREX	-11 3/4	- 11.19
N	114- 94	96		3M COMPANY	- 3	- 3.03
O	38- 34	35	1/4	MOORE BUS FORMS	- 1 5/8	- 4.41
N	43- 31	31		NASHUA CORP.	- 2 1/8	- 6.42
O	48- 35	38		REYNOLDS & REYNOLD	+ 1	+ 2.70
O	30- 26	26	1/4	STANDARD REGISTER	- 1 1/2	- 5.41
N	39- 32	32	1/2	UARCO	- 1/4	- 0.76
A	30- 13	13	1/8	WABASH MAGNETICS	- 2	- 13.22
O	41- 36	38	1/2	WALLACE BUS FORMS	- 1/2	- 1.28

COMPUTER SYSTEMS

EXCH	1970 RANGE	CLOSING PRICE			WEEK NET CHANGE	WEEK % CHANGE
N	172-129	130		BURROUGHS CORP	- 2 3/4	- 2.07
N	37- 20	21	5/8	COLLINS RADIO	- 1 3/8	- 5.98
N	122- 43	43	1/4	CONTROL DATA CORP	- 5	- 10.36
A	124- 84	84	5/8	DIGITAL EQUIPMENT	- 5 3/8	- 5.97
N	11- 5	5	5/8	ELECTRONIC ASSOC.	- 1 3/8	- 19.64
A	14- 6	6	3/4	ELECTRONIC ENGINEER.	- 3/4	- 10.00
N	39- 30	34	3/4	FOXBORO	+ 2 1/4	+ 6.92
O	42- 15	15	3/4	GENERAL AUTOMATION	- 1 1/2	- 8.70
N	77- 67	72	1/2	GENERAL ELECTRIC	- 4 1/4	- 5.54
N	45- 38	39	3/8	HEWLETT-PACKARD CO	- 1 1/8	- 2.78
N	152-114	115	1/4	HONEYWELL INC	- 9 1/2	- 7.62
N	387-306	309		IBM	-13 1/2	- 4.19
N	171-119	119	5/8	NCR	- 5 7/8	- 4.68
N	34- 24	25		RCA	- 1 1/2	- 5.66
N	33- 23	23	3/8	RAYTHEON CO	- 3 1/8	- 11.79
O	8- 2	4	7/8	SCI. CONTROL CORP.	- 5/8	- 11.36
N	40- 26	28		SPERRY RAND	+ 1/4	+ 0.90
A	49- 26	26	3/4	SYSTEMS ENG. LABS	- 2 1/4	- 7.76
N	29- 18	18	1/4	VARIAN ASSOCIATES	- 2 1/4	- 10.98
A	51- 28	31	1/8	WANG LABS.	- 3 1/2	- 10.11
N	115- 81	83		XEROX CORP	- 1 7/8	- 2.21

LEASING COMPANIES

EXCH	1970 RANGE	CLOSING PRICE			WEEK NET CHANGE	WEEK % CHANGE
O	9- 5	6		BANISTER CONTIN	- 1/4	- 4.00
O	25- 18	18	3/4	BOOTHE COMPUTER	- 1/4	- 1.32
O	8- 5	5	1/4	BRESNAHAN COMP.	- 1	- 16.00
O	8- 5	5	1/4	COMPUTER EXCHANGE	- 1/4	- 4.55
O	18- 4	4	1/2	COMPUTER LEASING	- 1/2	- 10.00
O	15- 7	7		CYBER-TRONICS	- 3/4	- 9.68
N	32- 14	13	1/4	DATA PROC. F & G	- 2 5/8	- 16.54
O	8- 4	4	1/4	DATRONIC RENTAL	- 1	- 19.05
A	24- 16	16	3/4	DEARBORN COMPUTER	- 2 5/8	- 13.55
O	8- 6	6	1/4	DIEBOLD COMP. LEAS.	- 1 1/2	- 19.35
A	10- 5	5	1/8	DPA, INC.	- 3/4	- 12.77
A	22- 12	13	1/4	GRANITE MGT	- 1 5/8	- 10.92
A	44- 7	7	7/8	GREYHOUND COMPUTER	- 1 1/8	- 12.50
N	30- 12	12	3/4	LEASCO DATA PROC.	- 1 1/2	- 10.53
O	5- 4	4	1/8	LECTRO COMP LEAS	- 3/8	- 8.33
A	19- 4	6	3/8	LEVIN-TOWNSEND CMP	+ 5/8	+ 10.87
O	4- 2	1	7/8	MANAGEMENT ASSIST	- 1/4	- 11.76
O	8- 6	6	3/4	NCC LEASING	- 5/8	- 8.47
O	8- 4	3	3/4	SYSTEM CAPITAL	- 1	- 21.05
A	19- 13	14	1/4	U.S. LEASING	- 1 1/8	- 7.32

PERIPHERALS & SUBSYSTEMS

EXCH	1970 RANGE	CLOSING PRICE			WEEK NET CHANGE	WEEK % CHANGE
N	62- 33	34	1/2	ADDRESSOGRAPH-MULT	- 5 1/2	- 13.75
O	15- 5	5	3/4	ALPHANUMERIC	- 3/4	- 11.54
N	48- 22	23	1/4	AMPEX CORP	- 5/8	- 2.62
O	18- 6	6	1/2	APPLIED LOGIC	- 1 1/4	- 16.13
A	34- 8	10		ASTRODATA	- 1 3/8	- 12.09
O	11- 7	7	1/4	BOLT,BERANEK & NEW	- 3/4	- 9.38
N	14- 11	10	1/4	BUNKER-RAMO	- 1 3/8	- 11.83
A	33- 18	20		CALCOMP	- 5/8	- 3.03
O	13- 6	5	3/4	COGNITRONICS	- 1	- 14.81
O	12- 8	9		COLORADO INST.	- 1/2	- 5.26
O	36- 21	22		COMPUTER COMMUN.	- 3	- 12.00
A	12- 6	6	1/8	COMPUTER EQUIPMENT	- 5/8	- 9.26
A	28- 20	22		COMPUTEST	- 2 1/4	- 9.28
A	25- 13	13	5/8	DATA PRODUCTS CORP	- 7/8	- 6.03
O	23- 13	13		DATA TECHNOLOGY	- 2	- 13.33
O	13- 8	8		DIGITRONICS	- 1/2	- 5.88
N	40- 17	18	3/4	ELECTRONIC M & M	- 1 1/8	- 5.66
O	8- 4	4	1/2	FABRI-TEK	- 3/8	- 7.69
O	17- 4	4		FARRINGTON MFG	- 1 5/8	- 28.89
O	7- 4	6	1/8	GRAHAM MFG.	+ 1/2	+ 8.89
O	20- 9	9	1/2	INFORMATION DIS	- 4 1/2	- 32.14
A	67- 25	25	3/8	MARSHALL INDUSTRIES	- 3/4	- 2.87
A	84- 26	26	3/4	MILGO ELECTRONICS	- 4 1/4	- 13.71
N	87- 42	41	1/2	MOHAWK DATA SCI.	- 3 1/2	- 7.78
O	52- 24	24		OPTICAL SCANNING	- 1	- 4.00
O	17- 8	8	1/4	PHOTON	- 7/8	- 9.59
O	4- 2	2	5/8	PHOTO-MAGNETIC SYS.	- 1/4	- 8.70
A	42- 27	32	1/2	POTTER INSTRUMENT	---	----
O	25- 14	14		PRECISION INST.	- 4 1/2	- 24.32
O	83- 32	32		RECOGNITION EQUIP	- 4 1/2	- 12.33
O	34- 18	18		REDCOR CORP.	- 3 3/4	- 17.24
N	29- 12	12	1/4	SANDERS ASSOCIATES	- 1	- 7.55
O	53- 17	13		SCAN DATA	- 4	- 23.53
O	23- 16	14	1/2	TALLY CORP.	- 3	- 17.14
N	159- 88	89	1/4	TELEX	-24 3/4	- 21.71
O	50- 24	24		VIATRON	- 4 3/4	- 16.52

SOFTWARE & EDP SERVICES

EXCH	1970 RANGE	CLOSING PRICE			WEEK NET CHANGE	WEEK % CHANGE
O	6- 3	3	1/2	ADVANCED COMP TECH	- 1/2	- 12.50
A	24- 4	4	3/4	APPLIED DATA RES.	- 1 1/2	- 24.00
O	8- 2	2	1/4	ARIES	- 7/8	- 28.00
A	47- 30	31		AUTOMATIC DATA PRC	- 1/8	- 0.40
O	14- 8	10		AUTO SCIENCES	- 1/2	- 4.76
O	9- 4	4		BRANDON APPL SYS	- 1/4	- 5.88
O	3- 1	1	3/8	COMPUTER AGE INDUS.	- 1/4	- 15.38
A	12- 4	4	3/8	COMPUTER APPL	- 1 1/2	- 25.53
O	14- 7	7	1/4	COMPUTER ENVIRON	- 3/4	- 9.38
NAT	10- 3	---		COMPUTER INDUS.	---	----
O	13- 5	7		COMPUTER NETWORK	- 1/2	- 6.67
O	15- 6	11	1/2	COMP. PROPERTY	- 1	- 8.00
N	34- 12	12	5/8	COMPUTER SCIENCES	- 2 3/4	- 17.89
O	8- 5	6	7/8	COMPUTER USAGE	+ 1 1/8	+ 19.57
A	75- 32	32	3/4	COMPUTING & SOFT	- 6 1/2	- 16.56
O	9- 4	4	5/8	COMRESS	- 7/8	- 15.91
O	14- 5	6	1/2	COMSHARE	- 1/2	- 7.14
O	3- 1	1	1/8	CONSOL. ANAL. CENT.	- 1/8	- 10.00
O	24- 9	9	1/4	DATA AUTOMATION	- 4 1/4	- 31.48
O	28- 14	14		DATA PACKAGING	- 5	- 26.32
O	6- 2	2	1/2	DATAMATION SERVICE	- 1/8	- 4.76
O	9- 5	7	1/2	DATATAB	- 3/4	- 9.09
O	4- 2	2	3/4	DIGITEK	- 1/8	- 4.35
O	13- 7	9	1/4	EDP RESOURCES	- 1 1/4	- 11.90
A	11- 5	6	3/8	ELECT COMP PROG	- 1/4	- 3.77
O	161-144	90		ELECTRONIC DATA SYS.	-67	- 42.68
O	20- 8	8	1/2	INFORMATICS	- 1	- 10.53
A	25- 11	12	1/4	ITEL	+ 3/8	+ 3.16
O	7- 1	2		LEVIN-TOWNSEND SERV.	+ 1	+100.00
A	25- 16	16		MANAGEMENT DATA	- 1 3/8	- 7.91
O	8- 5	5		NAT COMP ANALYSTS	- 1/4	- 4.76
O	12- 3	9	3/4	NAT.COMP. SERV.	+ 1/4	+ 2.63
N	54- 22	22	7/8	PLANNING RESEARCH	- 1 1/8	- 4.69
O	27- 15	15		PROGRAMMING METHODS	---	----
O	5- 3	3	1/4	PROGRAMMING & SYS	- 1/4	- 7.14
O	33- 9	9	1/2	PROGRAMMING SCIENCES	- 3 1/2	- 26.92
N	14- 4	5	1/8	SCIENTIFIC RESOURCES	- 1 3/8	- 21.15
O	2- 1	1	1/4	SOFTWARE SYSTEMS	- 3/8	- 23.08
O	3- 2	---		STRATEGIC SYS	---	----
O	27- 12	12		TBS COMP CENT INC.	- 4 1/2	- 27.27
O	4- 2	3	1/2	UNITED DATA CENTER	- 1/4	- 6.67
N	99- 28	31		UNIVERSITY COMP.	+ 1 1/4	+ 4.20
A	20- 6	7	1/4	URS SYSTEMS	- 3/4	- 9.38
O	13- 6	6	1/2	U.S. TIME-SHARING	- 1	- 13.33

Nickels and Dimes

While **DATATAB**'s year-end revenues zoomed 44%, earnings drop 50% on a per share basis, after taxes, extraordinary items and including investment tax credits. The computer service company posted total revenues of $3,437,882 compared to 1968's $2,388,554, and earnings of $116,043 compared to 1968's $173,549, which boils down to 20 cents a share against 41 cents a share.

$ $ $

In a significant bit of potential diversification, **ELECTRONIC MEMORIES & MAGNETICS** has agreed to buy $4 million of convertible notes and warrants of **SYCOR**, an Ann Arbor terminal maker. The notes and warrants could be transformed into one million shares of Sycor, which currently has only 1.4 million shares outstanding. The new arrangement will replace a previously announced loan of $1.9 million to Sycor by EM&M.

$ $ $

BIT, a mini maker with a long history of troubles, may finally be straightening out. So far this year the company has delivered $270,000 worth of BIT 438s, and has a backlog of $4 million. It expects 1970 shipments to hit $4.7 million. Last year total deliveries only managed to reach $480,000.

$ $ $

DEARBORN COMPUTER AND MARINE reports computer rental revenues for the first quarter at $4 million, up from last year's $3.4 million. Total company revenues were $9.4 million against 1969's $5.9 million. Net income was down to $727,000 from $766,000, or 47 cents a share against last year's 72 cents.

$ $ $

According to its president, Lester L. Kilpatrick, **CALCOMP** can"double its present $20-$25 million per year volume in the next 18 months without a corresponding increase in overhead." The part that makes it less than magical is a little exclusion of "manufacturing and service costs."

$ $ $

Year-end figures at **HETRA** (formerly Computer Network Systems) show total cash receipts of $2,361,000, of which $1,912,500 came from sale of stock. Total expenses were $591,959. Last month the company introduced its S/III data processing systems, minis using firmware and microprogramming.

$ $ $

And **WESTERN UNION** has completed the most profitable first quarter in its history. Preliminary figures show net income at $7.1 million, up from 1969's $6.1 million. Per share income, however, only increased to 72 cents from last year's 71 cents, due to an increase of 1.3 million shares of outstanding stock. Operating revenues were $98.5 million, up 5%. WU Chairman Russell McFall noted that the company is "looking at a number of . . . opportunities for diversification in the information field."

NEXT WEEK-OCR